ATTACHMENT A

U.S. EPA SUPERFUND

RECORD OF DECISION

LENZ OIL SERVICES, INC., SUPERFUND SITE

DUPAGE COUNTY, ILLINOIS

SEPTEMBER 1999

RECORD OF DECISION
SELECTED REMEDIAL ALTERNATIVE

DECLARATION

SITE NAME AND LOCATION

Lenz Oil Services, Inc., Superfund Site (Lenz Oil Site); DuPage County, Illinois

STATEMENT OF BASIS AND PURPOSE

This decision document represents the United States Environmental Protection Agency's (U.S. EPA) selected Phase I remedial action for the Lenz Oil Site located in southeast DuPage County, Illinois. This decision document was developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, with the National Oil and Hazardous Substance Contingency Plan (NCP). These decisions are based on information contained in the Administrative Record for the Lenz Oil Site. The Illinois Environmental Protection Agency (Illinois EPA) has not established a formal position regarding the remedy set forth in this Record of Decision (ROD).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

U.S. EPA , in consultation with Illinois EPA, is recommending that the Phase I primary remedy for the Lenz Oil Site consist of the following main components: excavation of the principal threat area, treatment of the contaminated material via solidification/stabilization (S/S), and disposal of the treated material within the original facility boundaries in a corrective action management unit (CAMU). At least two alternate Phase I cleanup approaches will be studied during predesign to evaluate whether an alternate approach would provide the same level of protection of human health and the environment as the primary remedy, and would provide other advantages such as being more cost-effective. If U.S. EPA decides, in consultation with Illinois EPA, that an alternate remedy is preferable to the primary remedy, it will publish its decision in either a ROD Amendment or an Explanation of Significant Differences (ESD). Once predesign studies are complete and U.S. EPA has made a final decision about the approach for Phase I, U.S. EPA will schedule a meeting with the community to present and explain the decision for the final Phase I remedy and receive comments from the community.

The objective of Phase I cleanup is to address the principal threat at the site, which is a layer of

light, non-aqueous phase liquid (LNAPL) floating on the water table and distributed within the surficial aquifer beneath the site. If, during remedial design/remedial action, dense non-aqueous phase liquids (DNAPLs) are found at the site, Phase I cleanup will address them. For Phase II cleanup, this ROD recommends implementing a pump-and-treat system for contaminants that remain in the aquifer after Phase I is complete. To assess the effect that Phase I cleanup will have on groundwater, at least one year of groundwater monitoring will be conducted before implementing Phase II. U.S. EPA will use results from this monitoring period, in consultation with Illinois EPA, to determine if an alternate Phase II remedy will achieve federal and state drinking water requirements within a reasonable time period. If U.S. EPA selects a Phase II alternate remedy, it will publish the decision in either a ROD Amendment or ESD and present the Phase II decision to the community.

The major components of the primary remedy for Phase I include:

- Treatability studies to ensure that S/S adequately immobilizes the contaminants
- Excavation of the LNAPL contaminated material
- Treatment of the LNAPL contaminated material via S/S
- Disposal of solidified/stabilized material in a CAMU

Two alternate remedies that will be evaluated during predesign are vacuum-enhanced recovery (VER) and treatment of the material in-place by low temperature thermal desorption (LTTD). The vacuum enhanced approach involves:

- Pumping the LNAPL using dual-phase extraction wells
- Application of a vacuum to increase the recovery rate of the LNAPL
- Capture and treatment of volatilizing compounds
- Potential use of air injection wells to further enhance the process

The treatment of material in-place by thermal desorption involves:

- Installation of thermal heating rods throughout the area of contamination
- In-ground treatment of the contamination via LTTD
- Installation of impermeable membranes between heating rods to provide a ground seal and capture volatilizing contaminants
- Off-site treatment of liquid product stream from LTTD process
- Treatment of off-gases either via activated carbon, an afterburner, or some other appropriate method

Unless U.S. EPA, in consultation with Illinois EPA, determines that a specific component listed below is not necessary, the Phase I that is implemented will also include the following:

- Periodic soil sampling, or some equally protective measure(s), in the vicinity of the pipelines to the west of the site to ensure that LNAPL does not migrate into the pipelines
- Removal and proper disposal of LNAPL and LNAPL-contaminated soil from area of monitoring well G105, located in the main excavation area

- Institutional controls and deed restrictions, as necessary
- Site fencing long-term operation and maintenance

STATUTORY DETERMINATIONS

The primary Phase I and Phase II selected remedies are protective of human health and the environment, comply with federal and state requirements that are legally applicable or relevant and appropriate to the remedial actions, and are cost effective. If U.S. EPA selects a contingent remedy for Phase I or II, it too will be protective of human health and the environment, comply with the federal and state requirements that are legally applicable or relevant and appropriate to the remedial actions, and be cost effective. The final Phase I and II remedies will use permanent solutions and alternative treatment technologies to the maximum extent practicable and will satisfy the statutory preference for remedies which employ treatment that reduce toxicity, mobility, or volume as a principal element. Because these remedies may result in hazardous substances remaining on-site above health-based levels, at least every five years after commencement of the remedial actions, U.S. EPA, in consultation with Illinois EPA, will conduct a review of these remedies to ensure that the remedies continue to provide adequate protection of human health and the environment.

Wm. E. Muno

William E. Muno
Director, Superfund Division

9/30/97
Date

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SUMMARY OF REMEDIAL ALTERNATIVE DECISION
LENZ OIL SERVICES, INC., SITE
DUPAGE COUNTY, ILLINOIS

I. SITE NAME, LOCATION AND DESCRIPTION

The Lenz Oil Services, Inc., Superfund site is located in an unincorporated area of southeast DuPage County, Illinois, and is approximately two miles northeast of the Village of Lemont, Illinois, two miles south of the Village of Burr Ridge, Illinois, and one mile east of Argonne National Laboratory (see Figure 1, Site Location). The Lenz Oil site consists of the Lenz Oil property and contiguous property which has contamination originating from the Lenz Oil property. From 1961 to 1985, the Lenz Oil property was the location of a waste oil recycling and transfer facility. The Lenz Oil property is bounded by Jeans Road on the south, by Route 83 on the west, by open land on the east, and by the Atchison, Topeka, and Santa Fe Railroad on the north. Currently contamination of the shallow aquifer extends beyond the Lenz Oil property south of Jeans Road for approximately 250 feet[1]. Approximately 400 feet southeast of the site is the closest significant surface water body, the Des Plaines River. Records indicate that much of the area to the south of Jeans Road, including a portion of the Lenz Oil site, is part of the 100-year flood plain for the Des Plaines River (see Figure 2, Features of Site Area). The location and extent of the 100-year flood plain will be verified during predesign work for the site.

Past operations at the Lenz Oil facility have led to the release of contaminated oil and solvents to facility soils, which then resulted in the presence of dissolved and non-dissolved oil and solvent contamination in the shallow "aquifer," beneath the site. It was due to this release of contaminants to area soils and the aquifer, that the Lenz Oil site is on the national Superfund list of contaminated hazardous waste sites.

The site is currently a flat, vacant, grassy area containing a radio tower, a number of monitoring wells and piezometers, a fire hydrant, two utility manways, and a fenced drum

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[1] Certain potentially responsible parties (PRPs) have expressed concern that terms used in this ROD, specifically including "groundwater," are an attempt to advantage Illinois in a dispute they have with the State. That dispute involves the intent and meaning of disputed terms ad obligations found in four consent orders entered between these PRPs and Illinois from 1988 to 1992. This concern in unfounded. The United States was not a party to those orders, is not bound by those orders, and is using terms as it deems appropriate for an understanding of this remedy. The United States is remaining neutral as to any issues between the parties to those State consent orders.

storage area. Drums in the storage area contain investigation-derived waste generated during site sampling and field activities. The portion of the site beyond the Lenz Oil property to the south of Jeans Road contains a residence adjacent to one corner along with several storage structures.

The portion of the site consisting of the Lenz Oil property is zoned as light industrial, has no present use contrary to the zoned use, and therefore may have a future use consistent with the light industrial zoning. The remaining portion of the site consisting of the property to the south of Jeans Road is also zoned as light industrial; however, because a residence exists on the property currently, future owners of the property may continue using the area for a residence.

Consequently, in evaluating current and future risks that the Lenz Oil site may pose, the U.S. EPA assumes that the Lenz Oil property portion of the site will have a light industrial future use. However, since a residence occupies the portion of the site to the south of Jeans Road even though it is zoned as light industrial, U.S. EPA assumes that the parcel will continue to be used for residential purposes.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

From approximately April 1961 through November 1985, Lenz Oil operated as a recycling, storage, and transfer facility for waste oil and solvent. In July 1981, the Illinois Environmental Protection Agency issued a "developmental" permit for Lenz Oil to operate as a waste management facility. In 1982, U.S. EPA cited the facility for operating as a Resource Conservation and Recovery Act (RCRA) hazardous waste facility without having an interim status permit. Although the facility owner then submitted an application for the required RCRA permit, the facility owner withdrew the permit application in November 1984, saying that the facility no longer handled hazardous waste. After a site inspection visit early in 1985, Illinois EPA and Lenz Oil entered into an agreed order on May 22, 1985, in which Lenz Oil agreed to prepare and implement a cleanup and closure plan for the site. Lenz Oil failed to carry out major portions of the court order and, in April 1986, filed for bankruptcy.

On January 17, 1986, Illinois EPA filed a State Record of Decision (State ROD) for immediate removal action at the Lenz Oil site[2]. Illinois EPA investigations of the Lenz

[2] The State's use of the term "site" is more limited than used in this ROD, and is approximately coextensive with the Lenz Oil facility property. See, for example, the definition of "site" in four consent decrees entered between the State and certain PRPs; Circuit Court for the Eighth Judicial Circuit, Chancery Division, DuPage County, Illinois, Docket No. 85-CH0466, at Section III, Paragraph A (March 30, 1988; March 29, 1989; April 25, 1989; and, January 22, 1992). For clarity, this ROD refers to the Lenz Oil property in situations where the State actions were approximately coextensive to the area, rather than risk confusion by using a term, "site," with

Oil property initiated in November 1985 found the items listed below at the site (see Figure 3, former site features).

- Three, 30,000- to 80,000-gallon unlined concrete underground storage tanks;
- Nine tank trucks with a total capacity of over 30,000 gallons;
- Fourteen low- to moderate-capacity above-ground or partially buried steel tanks;
- Six low-capacity underground steel tanks;
- A drum storage area containing approximately 200 drums; and
- Three surface impoundments constructed of porous cinder-type material.

In addition, oil and solvent waste contaminated the soil and the aquifer. Illinois EPA initiated cleanup of the Lenz Oil property the following year and by mid-1988 had incinerated all drum, tank, and tank truck contents; shredded and incinerated all on-property containers; emptied and decontaminated all tank trucks on the property; and demolished and removed all buildings, above-ground structures, and below-ground structures from the property. Illinois EPA excavated and incinerated about 21,000 tons of contaminated soil (see Figure 4, areas excavated during Illinois EPA removal). In addition, the Illinois EPA cleanup included filling the on-property surface impoundment areas and providing nearby residences with municipal water hook-ups.

National Priorities List
In October 1989, U.S. EPA listed the Lenz Oil site on the national priorities list, and in November 1989, certain PRPs for the site signed an administrative order on consent with U.S. EPA and Illinois EPA. Under this order, the PRPs agreed to conduct a remedial investigation / feasibility study (RI/FS), under the joint oversight of U.S. EPA and Illinois EPA, to determine the nature and extent of the remaining site contamination.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

U.S. EPA has accomplished public participation as required by Section 113(k)(2)(B)(I-v) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by SARA, by:

- Establishing site information repositories at the Lemont Village Hall, the Burr

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potentially two different meanings.

Ridge Village Hall, the Downers Grove Township Hall, and the U.S. EPA office in Chicago, Illinois, to allow local access to site-related documents;

- Updating the site administrative records at the Lemont Village Hall and at the U.S. EPA office in Chicago, Illinois, to include the proposed plan for this ROD and other documents relied upon for this ROD; the proposed plan and the most significant documents in the administrative records are also in the other two information repositories;

- Placing a formal advertisement announcing the commencement of the public comment period, the availability of the proposed plan, and the time and place of the public meeting in a local newspaper, *The Lemont Reporter*, on July 29, 1998;

- Mailing a proposed plan fact sheet, which contained the details about the site, the proposed remedies and the time, date and location of the public meeting, to the over 1400 addresses on the site mailing list;

- Releasing the proposed plan for public comment on July 30, 1998;

- Providing a 30 day comment period which was scheduled to end on August 28, 1998;

- Holding a public meeting was held on August 17, 1998, at the Witkoski Recreation Center in Lemont, Illinois, at which the U.S. EPA presented the proposed plan to the community and received verbal comments. U.S. EPA kept a transcript of the public meeting which it made available to the public and placed in the administrative records and the two information repositories;

- U.S. EPA granted a 19 day extension to the public comment period on August 24, 1998, extending the comment period to September 16, 1998;

- Placing advertisements in *The Reporter-Progress* on September 2, 3, and 4, 1998, announcing the extension to the public comment period to September 16, 1998;

- Receiving oral and written comments regarding the proposed plan for the ROD. U.S. EPA has addressed the comments in the attached responsiveness summary (Appendix A).

The ROD will become part of the administrative record pursuant to the national oil and hazardous substances contingency plan (NCP) at 40 C.F.R. § 300.825(a)(2). The two locations of the administrative record for the Lenz Oil site are listed below.

Lemont Village Hall
508 Lemont Street
Lemont, Illinois 60439

U.S. EPA, Region 5
Records Center, 7th floor
77 West Jackson Boulevard
Chicago, Illinois 60604

IV. SCOPE AND ROLE OF THE SELECTED REMEDY

Remedial Action Objectives

1. Prevent exposure to LNAPL and LNAPL-contaminated groundwater, above acceptable risk levels.
2. Prevent or minimize further migration of the LNAPL contaminant plume.
3. Extract or treat the LNAPL plume in the aquifer.
4. Prevent or minimize further migration of LNAPL contaminants to groundwater.
5. Achieve MCLs, the SDWA, and the State standards pursuant to IAC Title 35, Chapter I, Part 620 throughout the plume in a reasonable amount of time.

In developing the remedial objectives for the overall cleanup for the Lenz Oil site, U.S. EPA had to evaluate ways of removing or treating non-dissolved LNAPL in the aquifer, ways of managing water encountered during LNAPL cleanup activities at the site, and ways of treating, restoring, or otherwise addressing any remaining aquifer contamination after completing non-dissolved LNAPL cleanup activities.

Remedial Action Plan

This ROD presents a two-phased approach for achieving the remedial action objectives and cleaning up the Lenz Oil site:

- Phase I will address the principal threat at the site, i.e., the LNAPL[3] plume and associated non-dissolved LNAPL-contaminated material within the shallow aquifer[4].

- Phase II will address residual dissolved contamination remaining in the aquifer

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[3] "LNAPL" stands for "light, non-aqueous phase liquid" and refers to the oil layer that is floating on the water table within the aquifer beneath the Lenz Oil site. "Non-aqueous" refers to the fact that it does not readily mix with water, or is "non-dissolved" contamination within the aquifer. "Light" refers to the fact that the oil is less dense than water and, therefore, tends to float on top of the water in the aquifer.

[4] If dense, non-aqueous phase liquids (DNAPLs) are found at the site during remedial design/remedial action, possible approaches will be considered for addressing the problem, and any action selected to address the DNAPLs will occur as part of Phase I cleanup.

after completing phase I.

In all cases, the phase I and phase II remedial alternatives implemented at the Lenz Oil site will be protective of human health and the environment and will comply with state and federal regulations. To protect human health and the environment until cleanup standards are achieved and maintained, all remedial alternatives except for the phase I, "No action" alternative I, require fencing, institutional controls including deed restrictions, and a monitoring program.

As discussed below, this ROD provides for evaluating alternate phase I and II remedies during the phase I predesign and phase II predesign, respectively. U.S. EPA, in consultation with Illinois EPA, will review the results of the predesign studies and any other information that is pertinent, to determine whether to select an alternate phase I and/or phase II remedy. U.S. EPA will use the nine criteria for selecting a remedy, as outlined in the NCP, to evaluate each viable alternative. If U.S. EPA selects any alternate phase I or II remedy other than the primary alternative described in this ROD, U.S. EPA will issue either a ROD amendment or an explanation of significant differences to notify the public about the remedy selection. U.S. EPA will also schedule a public availability session after it has evaluated the phase I and phase II predesign studies.

Phase I Selected Remedy:

For phase I cleanup, this ROD recommends one cleanup alternative as the primary alternative and recommends studying two additional remedial alternatives, included in the alternatives array, during phase I predesign. The two alternate remedies were chosen for study during phase I predesign because they may have significant advantages over the primary alternative but were not adequately evaluated as potential remedial alternatives during the Lenz Oil RI/FS process. These predesign studies will determine if either of the two alternatives would provide a similar level of protection to human health and the environment as the primary alternative, but with other significant benefits such as a lower cost and less physical impact on the community.

The primary alternative to address the LNAPL at the site involves excavating the area where subsurface LNAPL contamination exists. In particular, the primary alternative provides for skimming off uncontaminated surface soils and temporarily storing these soils, excavating the LNAPL and LNAPL- contaminated material, stabilizing the excavated LNAPL-contaminated material with a suitable stabilizing agent, and disposing of the material on the northern half of the site in a corrective action management unit, as provided for under Subtitle C of RCRA. For this alternative, treatability studies during predesign will determine what mixture of stabilizing agents are suitable for the LNAPL-contaminated material. The excavated area will be re-graded with uncontaminated soils and re-vegetated.

Both of the alternate cleanup approaches for phase I avoid the extensive soil and subsurface excavation required by the primary recommended alternative, although both alternatives employ significantly different approaches. The first alternate phase I cleanup approach in this ROD is to extract the LNAPL using vacuum-enhanced recovery combined with disposal off-site of the extracted LNAPL at a permitted incinerator. In this approach, applying a vacuum to a number of extraction wells placed throughout the contaminated area will enhance the removal of the LNAPL from the subsurface. At the same time, any compounds from the subsurface that volatilize and enter the extraction wells will be captured in the vacuum system and treated. Air injection wells interspersed among the extraction wells may also be installed to ensure that the vacuum created in the subsurface does not become so strong so as to inhibit the extraction of the LNAPL.

The second alternate phase I cleanup approach included in this ROD is *in situ*, or "in place", treatment of the LNAPL using a recently developed application of the technology called low temperature thermal desorption. In this approach, no excavation will occur; instead, thermal rods will be placed into the ground to treat the LNAPL-contaminated subsurface via low temperature thermal desorption.

Phase II Selected Remedy:

For phase II cleanup, this ROD recommends implementing a pump-and-treat system. Because alternatives 9A and 9B would remove essentially all of the non-dissolved LNAPL and would significantly alter the aquifer conditions, it is possible that a phase II pump-and-treat action may not be necessary for those alternatives. The phase II cleanup otherwise would involve pumping dissolved contaminants from the aquifer to the surface, treating the contaminants, properly disposing of the treated contaminants off-site, and discharging the treated waters to the local publicly owned treatment works in compliance with all pre-treatment requirements.

Phase II cleanup of the Lenz Oil site provides for further action at the site if, after phase I cleanup is complete, dissolved contaminants in the aquifer are present at levels exceeding cleanup standards and the contaminants in the aquifer are migrating.

However, following completion of phase I and before constructing and implementing phase II, where EPA determines that contaminant migration is not a significant concern, this ROD recommends conducting aquifer and other relevant monitoring studies and evaluating alternatives, including but not limited to studies of whether dissolved contaminants will naturally attenuate. The phase II predesign studies will evaluate each alternative's ability to achieve aquifer cleanup standards based upon the site conditions after phase I. To determine whether something other than a full active pump-and-treat approach to dissolved contamination in the aquifer will be acceptable, it is necessary to monitor the aquifer and conduct related sampling in the area of the site for at least one year following the completion of phase I cleanup.

V. SITE CHARACTERISTICS

The remedial investigation (RI) for the Lenz Oil site was initiated by the PRPs' contractor, ERM-North Central, Inc. in January 1991. The investigation was completed in October 1992, when an RI report was issued. Prior to completion of the FS report, several other sampling events took place at the site to collect more information about the nature and extent of the LNAPL in the subsurface (see Figure 5, location of LNAPL plume). Results of these subsequent investigations are summarized in two reports: technical memorandum No. 4: LNAPL evaluation (ERM, March 1995) and supplemental LNAPL investigation report (Conestoga-Rovers & Associates, October 1997). The RI and supplemental reports identified the types of contaminants in the surface and subsurface of the Lenz Oil site, in the ditch along the northern border of the site, and in the aquifer. The key conclusions from these investigations are as follows:

- LNAPL is present within the vadose zone of the shallow aquifer and is floating on (non-dissolved) and within (dissolved) the water table beneath the Lenz Oil site; the LNAPL plume covers an area approximately 1.5 acres in size and is primarily located in the portion of the Lenz Oil site down gradient (southeast) of the original facility boundaries.

- The LNAPL at the site has been identified as a "principal threat", as defined in U.S. EPA guidance and the NCP.

- Dissolved LNAPL contaminants have been detected within the water of the shallow aquifer beneath the non-dissolved LNAPL plume. Results from dissolved contaminant groundwater samples collected down gradient of the LNAPL plume could not be used to definitively ascertain the down gradient extent of the dissolved contaminant groundwater plume. However, it appears that the dissolved contaminant groundwater plume is restricted to the area of the aquifer in contact with the non-dissolved LNAPL contaminant plume.

- Except for the most up gradient edge of the LNAPL plume, which is located within the original Lenz Oil facility boundaries, no extensive areas of contaminated soil were detected in or around those areas addressed during the Illinois EPA removal action conducted in 1987 and 1988.

- The best estimates for the areal extent and volume of LNAPL present beneath the site are 67,000 square feet and 15,000 gallons, respectively.

- Based on samples collected during the RI and subsequent investigations, the deeper portions of the aquifer beneath the site do not appear to be impacted; however, the deeper portions of the aquifer and the possibility of DNAPLs at the

site will be investigated further during remedial design/remedial action.

Sampling Conducted at the Site

Illinois EPA conducted soil, sediment, surface water, and groundwater sampling both before and after the removal action initiated in 1987. As part of the follow-up to the removal action, Illinois EPA also collected over 40 soil samples in the vicinity of the areas excavated during the removal. During the RI for the Lenz Oil site, which was conducted by the PRPs' consultants, a groundwater use survey was done and a number of samples were collected, including samples of soil, soil gas, surface water, sediment, and ground water. The soil gas investigation involved collecting a total of 32 samples from an area approximately 3 acres in size. The samples were collected from depths of up to 36 inches below ground level and were analyzed for seven volatile organic compounds (VOCs).

One sediment sample, one surface water sample, and two soil samples were collected from each of six locations along the banks of the drainage ditch on the northeastern border of the Lenz Oil site (see Figure 6, shallow soil sampling locations; Figure 7, deep soil sampling locations; and Figure 8, surface water and sediment sampling locations). To investigate ground water at the site, a total of 15 monitoring wells were installed during the RI. Eight additional monitoring wells installed by Illinois EPA during the removal action were also sampled. Two rounds of monitoring well sampling were conducted. The monitoring wells installed during the RI consisted of seven two-well clusters and one deep well. The pre-existing wells on the site were well clusters at four different locations (see Figure 9, monitoring well and piezometer locations[5]). "Deep" and "shallow" wells were generally differentiated by categorizing those wells screened between 37 and 52 feet below ground level as "deep", and those screened between 9 and 31 feet below ground level as "shallow". In each two-well cluster, shallow wells were generally installed within 10 feet of the deep wells. For those clusters which consisted of three wells, the "intermediate" well was generally screened between 20 and 31 feet below ground level.

Field and sampling activities in 1994, summarized in technical memorandum No. 4, included the installation of ten piezometers and ten soil borings, along with the collection and analysis of three LNAPL samples and five subsurface soil samples (for piezometer locations, see Figure 9[6]). Additional sampling in 1997, as summarized in the supplemental LNAPL investigation report, included installing six additional piezometers

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[5] Wells installed during the RI have a "MW" prefix in Figure 9. Pre-existing wells at the site are those with a "G" prefix in their label.

[6] Piezometers installed during 1994 are generally identified as the lowest numbered locations with the prefix "P" in Figure 9.

and nine additional soil borings (for piezometer locations, see Figure 9[7]). Also, ground water from two previously existing shallow monitoring wells and three of the newly-installed piezometers was also sampled at this time (MW-3S, MW-6S, P-28, P-29 and P-30).

Site Hydrogeologic Data and Groundwater Flow

The shallow geology at the site consists of Silurian dolomite bedrock overlain by up to 26.5 feet of unconsolidated glacial and alluvial deposits and assorted fill material (see Figures 10, 11, and 12). Bedrock present beneath the site is part of the Racine dolomite formation, which is characterized by discrete fracture zones, most of which are horizontal and appear to be bedding planes. In general, you encounter bedrock between 10 and 26 feet below ground level in the area of the site.

The unconsolidated deposits directly on top of the bedrock consist of silty gravel with some sand and clay. Deposits on top of this layer consist of silt and silty clay. The area which Illinois EPA excavated during the 1987 and 1988 removal action was backfilled with incinerator ash from the on-site incinerator, as well as some sand and gravel.

The water level of the aquifer beneath the site varies between approximately 4 and 12 feet below ground level depending on the amount of precipitation in the area. Ground water from the unconsolidated deposits and from the bedrock are not isolated from one another, and together form a single, unconfined, hydraulically interconnected aquifer. This surficial aquifer consists of a thin (0 to 26.5-foot) layer of unconsolidated material overlying approximately 150 to 200 feet of Silurian dolomite. The characteristics of the aquifer at the site meet the State of Illinois criteria for a Class I aquifer, meaning that it is a potential drinking water source (see Table 1, ground water classification criteria).

Ground water in the aquifer generally flows to the south and southeast towards the Des Plaines River, where it eventually discharges.

Surface Water Hydrology

The Lenz Oil site is located at the base of a 75 foot bluff that defines the northern boundary of the Des Plaines River Valley. According to the 100-year flood plain map from the Federal Emergency Management Agency backwater from the Des Plaines River would reach the site during a 100-year flood event. However, some of the elevations shown on the FEMA flood plain map do not match surveyed elevations recorded during the RI. The predesign studies for the site will include reevaluating site elevations and the area of the 100-year flood plain.

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[7] Piezometers installed in 1997 are those on Figure 9 with labels P-25S, P-28, P-29, P-30, P-31, and P-32.

Surface water at the site generally seeps into on-site soil or flows to the west and northwest where it enters the drainage ditch along the northwestern edge of the site. The water in the ditch intermittently flows to the southwest and appears to pond on an auto scrap yard to the west of Illinois Route 83. During wet periods, the ditch generally contains running water, and under high flow conditions the water in the ditch eventually discharges to the Des Plaines River. Recent construction work on the Route 83 overpass may have altered the surface water flow patterns on the site and the flow of water in the drainage ditch. The predesign studies will include reevaluating surface water drainage patterns at the site to determine if any conditions have changed.

Nature of Site Contamination

Results of sampling and investigation during the RI and subsequent field activities revealed the presence of a number of potential contaminants of concern both on- and off-site. Contaminants found in the area of the site included heavy metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). This section summarizes highlights of analytical results of samples according to the area of the site in which they were found, i.e, main excavation area, surface impoundment excavation area, or drainage ditch, or the aquifer in which they were found, i.e., non-dissolved LNAPL or dissolved LNAPL contaminants in ground water. The three sampling areas are defined below.

- **Main excavation area:** This is the area excavated during the Illinois EPA removal action initiated in 1987. The area generally coincides with the area of the former Lenz Oil facility on which the various storage tanks, tanker trucks, and drums were located. The main excavation area is approximately 1.5 acres in size. Shallow and deep soil samples were collected near and in this area.

- **Surface impoundment excavation area:** This area, which is less than a 1/4 acre in size, is located to the east of the main excavation area and was the location of a former surface impoundment on the Lenz Oil facility property excavated during the Illinois EPA removal action. Shallow and deep soil samples were collected near and in this area.

- **Drainage ditch:** This refers to the ditch that runs along the northwestern border of the Lenz Oil site. Soil, sediment, and surface water samples were collected from this area.

LNAPL: Samples of the non-dissolved LNAPL floating in the surficial aquifer beneath the Lenz Oil site contained the highest levels of contaminants found (see Table 2, concentrations of organic contaminants in LNAPL, ground water, and soil; and Table 3, concentrations of inorganic contaminants in LNAPL, ground water, and soil). Three LNAPL samples were collected during each of the sampling efforts in 1991, 1994 and 1997. Samples collected in 1997 were analyzed for VOCs only. Results from each

sampling event showed that some of the compounds and analytes detected in the LNAPL, along with the range of concentrations at which they were detected, included:

- **VOCs**: acetone (4,200 to 500,000J[8] ug/L), total 1,2-dichloroethene (39,000 to 460,000J ug/L), toluene (49,000 to 4,400,000 ug/L), ethyl benzene (6,900 to 2,000,000 ug/L), and total xylenes (4,700 to 8,500,000 ug/L)
- **SVOCs**: bis(2-ethylhexyl)phthalate (110,000J ug/kg) and 2-methyl-naphthalene (1,000,000 to 2,900,000 ug/kg)
- **PCBs**: Aroclor-1242 (65,000J to 210,000J ug/kg) and Aroclor-1260 (38,000J to 42,000J ug/kg)
- **Inorganics**: arsenic (1,900J to 5,800J ug/kg), barium (121,000 to 219,000J ug/kg), cadmium (11,200 ug/kg), chromium (4,600J to 5,700 ug/kg), lead (81,000 to 150,000 ug/kg), and zinc (3,300J to 7,100J ug/kg).

Toxicity characteristic leaching procedure tests were also run on two of the LNAPL samples collected in 1991. None of the results from the VOC and SVOC analyses were useable; however, seven of these eight tests for inorganics yielded useable results. Both LNAPL samples passed this test for silver and selenium. For arsenic, cadmium, and chromium, one of two of the LNAPL samples failed, and for barium and lead, both LNAPL samples failed.

Dissolved LNAPL Contaminants in the Aquifer: Ground water samples were collected in 1991 and in 1997 (see Table 2, concentrations of organic contaminants in LNAPL, ground water, and soil; and Table 3, concentrations of inorganic contaminants in LNAPL, ground water, and soil). During 1997, samples were analyzed for VOCs only, and only shallow wells or piezometers were sampled. Contaminants detected in ground water samples from the vicinity of the Lenz Oil site, along with the maximum level at which they were found and the general depth of the well in which they were found, included:

- **VOCs:** acetone (150J ug/L; shallow), toluene (360J ug/L, shallow; 4J ug/L, deep), ethyl benzene (440J ug/L; shallow), and total xylenes (2,400J ug/L; shallow)
- **Chlorinated VOCs**: total 1,2-dichloroethene (21 ug/L, shallow; 15 ug/L, intermediate), 1,1-dichloroethane (60 ug/L, shallow; 70 ug/L, intermediate), 1,1-dichloroethene (50 ug/L, shallow; 3J ug/L, intermediate), chloroethane (100J ug/L, shallow; 53 ug/L, deep), vinyl chloride (11J ug/L, shallow; 15J ug/L, intermediate), 1,1,1-trichloroethane (120 ug/L, shallow; 83 ug/L, intermediate; 2J ug/L, deep), trichloroethene (6 ug/L, shallow; 3J ug/L, intermediate), tetrachloroethene (3J ug/L, shallow; 2J ug/L, intermediate)
- **SVOCs**: 2-methynaphthalene (4,000 ug/L; shallow)

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[8] A "J" after a sampling result indicates that the result should be considered to be "estimated".

- **PCBs**: Aroclor-1242 (160 ug/L; shallow) and Aroclor-1260 (97J ug/L; shallow)

- **Inorganics**: arsenic (total) (92J ug/L, shallow; 5.4J ug/L, deep), barium (total) (1,410J ug/L, shallow; 123J ug/L, intermediate; 117 ug/L, deep), lead (total) (564 ug/L; shallow), zinc (total) (386J ug/L, shallow; 48 ug/L, intermediate; 21.9J ug/L, deep), and cyanide (44.9J ug/L; shallow).

The two shallow groundwater monitoring wells closest to the Des Plaines River that were sampled again in 1997 did not contain detectable levels of VOCs.

The concentrations of a number organic compounds at different depths in several monitoring wells are shown in Table 4 (concentration gradients of contaminants in monitoring wells). The increasing concentrations with depths for several of the compounds indicate that they may be descending deeper into the aquifer due to their relatively high density. This indicates that dense, non-aqueous phase liquids, or "DNAPLs", may be present in the aquifer. Additional monitoring wells will have to be installed during and/or after phase I predesign work to determine if there is a DNAPL problem at the site. The remedy selected for phase I will address the LNAPL problem at the site; however, if DNAPL is found at the site during remedial design/remedial action and it is determined that an action needs to be taken to address the problem, the action would be done as part of phase I cleanup.

Main excavation area: For the most part, soil samples collected from in and around this area did not contain significant levels of contaminants. Several isolated samples, typically from just outside the excavation area, did contain some contaminants. Generally, total VOC concentrations in soil samples ranged between 50 and 200 ug/kg. One shallow soil sample located near the west corner of the area (SB19) contained nearly 600 ug/kg total VOCs. The other samples that contained levels of total VOCs ranging from 200 ug/kg (SB22) to 60,000 ug/kg (SB12) were all located along the southern edge of the excavation area, now known to be the "beginning" of the LNAPL plume. PAHs, typically at levels near 300 ug/kg, were also detected in soils collected from along the perimeter or outside of the excavation area. Two samples, SB12 and SB14, contained higher levels of PAHs, with total PAHs in these two samples ranging between 50,000 and 60,000 ug/kg. Six samples, five of which were collected from along the perimeter of the excavation area, contained PCBs at levels greater than 100 ug/kg and in one case at a concentration of 6,700 ug/kg. Elevated levels of inorganic compounds were found in the majority of soil samples.

The unacceptable risks posed by the site, as determined by the baseline risk assessment, were not heavily influenced by the VOCs, PAHs, and inorganic compounds detected in the soil samples due to the concentration levels at which they were present and their

relative lack of toxicity compared to PCBs.

Surface impoundment excavation area: Similar to the results for the samples collected from in and around the main excavation area, samples from the vicinity of the surface impoundment excavation area did not, for the most part, contain significant levels of contaminants, nor did the area comprise a significant area of unacceptable risks posed by the site. Two samples, SB202 and SB203, located generally to the north of the surface impoundment excavation area, contained levels of total PAHs in the 10,000 to 30,000 ug/kg range. SB202 and another sample in the same general area, SB201, contained PCBs at levels between 660 to 1,000 ug/kg. Elevated levels of inorganic compounds were found in the majority of soil samples.

As with the samples collected near the main excavation area, the contaminants found in these samples did not significantly contribute to the unacceptable risks posed by the site, due to the concentration levels of the contaminants and, in the case of the PAHs, their relative lack of toxicity compared to PCBs.

Drainage ditch: Results from surface water, sediment and soil samples collected from or near the drainage ditch showed the presence of a few organic compounds at levels only slightly above detection limits. Concentrations and number of SVOCs and inorganics in drainage ditch sediment and soil samples, however, were of significance. Results for inorganic compounds from samples of drainage ditch surface water were also of note.

All six surface water samples contained elevated levels of several inorganic compounds, including barium, cadmium and zinc. Sediment samples from the ditch generally contained total PAHs in the 30,000 ug/kg range along with elevated levels of metals. Soil samples from both the northern and southern banks of the ditch contained elevated levels of PAHs and some metals. One soil sample from along the northern bank of the ditch contained two PCB congeners at concentrations of 2500 and 2800 ug/kg.

In addition to the three areas on the Lenz Oil site described above, another area of the site that should be noted is the area around monitoring well G105, located in the main excavation area. On Figure 9, G105 is identified with the label "P01". Monitoring well G105 was installed prior to the initiation of the removal action by Illinois EPA and remained intact after the completion of the removal. To prevent the uncontaminated soil and ash used to backfill the excavation area from becoming recontaminated by the LNAPL and LNAPL-contaminated soil surrounding G105, a layer of visqueen was installed between the well and the excavation backfill to keep the contaminated soil separate from the clean backfill area.

Identification of Principal Threat

Based on the high concentration of contaminants in the LNAPL which are either carcinogenic or cause non-cancerous negative impacts to human health, or both, the

LNAPL is a principal threat at the Lenz Oil site (see Tables 2 and 3). According to the NCP, U.S. EPA expects to use "treatment to address the principal threats posed by a site, wherever practicable". 40 C.F.R. § 300.430(a)(1)(iii). The NCP describes principal threats as highly toxic or highly mobile materials that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur and include materials having high concentrations of toxic compounds.

VI. SUMMARY OF SITE RISKS

A U.S. EPA consultant completed the baseline risk assessment for the Lenz Oil site in August 1992. It is part of the RI report. The risk assessment characterized the potential risks to human health and the environment caused by chemicals of potential concern at the Lenz Oil site. Exposure was evaluated in relation to two land use scenarios: (1) current land use conditions, including trespassing, residential use, and recreation; and (2) future land use, including residential use of the site and the area adjacent to the site, and short-term risk to on-site workers. The primary exposure pathways evaluated were skin contact with soil, ground water, surface water, or sediment; and ingestion of soil, ground water, or surface water. Concentrations of contaminants, risks associated with those contaminants, and cleanup standards (MCLs) are shown in Tables 2 through 7. The risk assessment results indicated that the following compounds contributed to the risks posed by the site:

- trichloroethene
- tetrachloroethene
- chloroform
- vinyl chloride
- benzene
- 1,1-dichloroethene
- 1,2-dichloroethene
- PCB isomers
- carcinogenic PAHs
- pesticides

Risk assessment results indicate that adjacent and future residents or on-site workers or trespassers may be exposed to potential chemicals of concern by touching or ingesting the LNAPL or LNAPL-contaminated soil or groundwater; or by breathing in particles or vapors from the LNAPL or LNAPL-contaminated soil or groundwater. The index for assigning a value to the noncarcinogenic risk posed by the site is the hazard index, or "HI". When a HI is greater than one and a person is exposed to the contaminants at a site, there is a potential for health problems such as damage to vital organs, birth defects, and anemia and other blood disorders. The carcinogenic risk posed by a site is quantified by

determining the increase in cancer risk caused by a site over the course of a lifetime that is in excess of the natural of background risk of contracting cancer. A $1x10^{-6}$ excess lifetime cancer risk indicates that exposure to contaminants at the site would introduce 1 additional case of cancer in a population of 1,000,000. For an individual this would mean that the risk of developing cancer over a period of 70 years increases by a factor of 1 in 1,000,000. Similarly, $1x10^{-5}$ corresponds to an excess lifetime cancer risk of 1 in 100,000 over what is normal, and $1x10^{-4}$ corresponds to an excess lifetime cancer risk of 1 in 10,000 over what is normal. U.S. EPA may act to clean up a site if the HI for the site is greater than or equal to 1, or if the excess lifetime cancer risk posed by the site exceeds $1x10^{-4}$. Summaries of potential carcinogenic risks and potential non-carcinogenic risks posed by the Lenz Oil site are shown in Tables 5 and 6, respectively.

The most significant cancer risks for a future resident using contaminated groundwater from the Lenz Oil site range from 4×10^{-2} to 4×10^{-8}. A HI of 1.7 was also predicted for this pathway. The most significant cancer risks for a future resident using contaminated groundwater from off-site range from 1×10^{-4} to 1×10^{-5}, with an HI of 1.7.

The most significant cancer risk for a future on-site receptor due to ingestion or dermal contact with soil is 1×10^{-5}. For ingestion and dermal contact exposures of a shorter duration, that is, for trespassers and short-term workers, the cancer risk is 1×10^{-8}.

The most significant cancer risks for current and future residents on or adjacent to the site, due to inhalation of contaminants, range from 1×10^{-2} to 1×10^{-3}. However, because these numbers were calculated assuming that subsurface soils were actually surface soils, we believe that this risk range is overstated.

Ecological Risks

No ecological risk assessment was performed for the Lenz Oil site since the dissolved and non-dissolved LNAPL are approximately four to ten feet below the soil surface in the aquifer, and are not accessible to the environment. Risk associated with the potential for migration of chemicals into the Des Plaines River would primarily occur via transport of chemicals in ground water or by migration along underground conduits. The potential risk due to site contaminants entering the river was not quantitatively evaluated because, according to the dilution model used, contaminant levels in samples of ground water from the four monitoring wells closest to the river should not be entering the Des Plaines River at levels above ambient water quality criteria. No organic compounds were detected in any of the four monitoring wells near the river. In addition, ten soil borings in the area between the site and an underground pipeline showed that neither the dissolved nor non-dissolved LNAPL contaminants were present in this area, and no oil seeps have been observed along the banks of the Des Plaines River. Phase I and phase II cleanups will be protective of the ecological habitats.

VII. DESCRIPTION OF REMEDIAL ALTERNATIVES

The FS Report, FS Addendum, and supplemental information prepared for the site identify and evaluate alternatives to address site threats or potential threats. Of eleven initial phase I alternatives and their variations that were considered, U.S. EPA and Illinois EPA identified five to evaluate in depth that represented the range of viable cleanup alternatives for the site. Of the three phase II alternatives, U.S. EPA and Illinois EPA identified two to evaluate in depth that represent the range of viable cleanup alternatives for the site. Nonetheless, this ROD recommends providing an opportunity to evaluate the then post-phase I conditions and the available alternatives to determine whether an explanation of significant differences or ROD amendment may be appropriate. All five phase I and phase II alternatives include the following common components:

- Periodic soil and/or groundwater sampling, or some other equally protective measure(s), to ensure that the LNAPL does not migrate into the pipeline corridors located west of the site
- Fencing and institutional controls such as deed restrictions
- Long-term monitoring of the aquifer, as appropriate to develop data for the phases I and II pre-design, design, remedy implementation, post-remedy construction and/or periodic remedy review.

Four of the five phase I alternatives, except alternative 1, no action, include the following common components:

- Removal of monitoring well G105 located in the main excavation area and cleanup of LNAPL and LNAPL-contaminated soil surrounding the well
- Groundwater management during cleanup activities
- Long-term operation and maintenance
- Ecological risk assessment(s)
- Post-phase I site conditions and analyses, and an evaluation of phase II alternatives for addressing any remaining aquifer contamination
- Completion of phase II cleanup action

Ways of addressing the LNAPL in the subsurface during phase I cleanup include: (1) pumping the LNAPL out of the subsurface either via extraction wells or from trenches dug into the ground; (2) physically excavating the LNAPL and LNAPL-contaminated material; (3) enhanced variations of either of these latter options; or (4) treating the LNAPL and subsurface contamination while still in the ground. In all cases, the extracted LNAPL and LNAPL-contaminated material would be appropriately treated once removed from the ground. The appropriate treatment method for recovered pure LNAPL will be to transport it off-site to a hazardous waste incinerator that is in compliance with both RCRA and Toxic Substances Control Act (TSCA) regulations. For the LNAPL-

contaminated material, several different treatment options are available. The two options believed to be most viable and that are included in one or more of the evaluated remedial alternatives are solidification/stabilization and low temperature thermal desorption.

Ways of managing subsurface water during phase I cleanup activities include: (1) pumping it to an on-site treatment system, meeting the pre-treatment criteria of the publicly owned treatment works (POTW), and disposing of the treated ground water in a sewer; or (2) pumping it out, separating out residual oil and contaminants for off-site treatment in a hazardous waste incinerator that is in compliance with RCRA and TSCA, and disposing of the water if it meets criteria required by the POTW without further treatment, directly into a sewer. The type of treatment system used, if one is necessary, will depend on what types of contaminants are present in the water at levels that exceed the criteria of the POTW. For example, if one or more VOCs in the water must be removed prior to discharge to a POTW, a granular activated carbon treatment system or an air stripper system might be used.

Regarding the requirement in this ROD for sampling in the vicinity of the underground pipelines to the west of the site, if LNAPL migrates into this area, the pipeline trench may serve as a preferential pathway for the LNAPL to migrate to the Des Plaines River. To ensure that this does not occur, soil and/or aquifer sampling in the vicinity of the underground pipelines, or some other equally protective measure(s), will be conducted periodically. The sampling method and frequency will be developed to ensure that the LNAPL does not migrate into the pipeline area.

A. Phase I

All of the alternatives described below relate to phase I cleanup only. Nonetheless, all phase I alternatives include fencing, institutional controls including deed restrictions, and periodic maintenance and monitoring as required by CERCLA. Phase II activities are described in Part B below.

ALTERNATIVE 1 -- NO ACTION

CERCLA requires evaluation of the no action alternative at every site to establish a baseline against which all other alternatives are compared. Under this alternative, no remedial actions would take place and the site would remain in its present condition. Estimated costs associated with the no action alternative are:

Capital cost:	0
Maintenance and monitoring cost:	$10,000
Estimated present net worth over 30 years:	$22,000
Estimated time to construct:	None
Estimated cleanup time:	Will not achieve

Note: The $10,000 maintenance and monitoring cost is not an annual cost, but reflects the cost of reviewing site conditions every five years over a thirty year period.

ALTERNATIVE 2 – FENCING, INSTITUTIONAL CONTROLS, AND LNAPL CONTAINMENT AND PARTIAL RECOVERY VIA PASSIVE COLLECTION

Alternative 2 contains the LNAPL via passive collection so that it does not migrate beyond the current plume boundaries and does not migrate into the Des Plaines River. The major elements of alternative 2 include:

- LNAPL containment via periodic, passive LNAPL recovery over a 30-year period from four covered trenches
- Off-site disposal of the collected LNAPL at a permitted incineration facility

Additional elements of alternative 2 are:

- Collection of ground water that accumulates in the four containment trenches, treatment if necessary, and disposal via public sewer to a local POTW
- Site fencing and institutional controls
- Evaluation of the appropriate action for addressing any remaining aquifer contamination in phase II cleanup and subsequent implementation of phase II
- Long-term operation and maintenance

Four below-ground, covered collection trenches would be constructed in the area of the LNAPL. The trenches, which would be filled with gravel and capped with a clay seal, would be approximately 3 feet wide, 12 feet deep, and 250 feet long, and would run parallel to Jeans Road (see Figure 13). The LNAPL would passively accumulate in the bottom of the trenches over time. Depending on the amount of rainfall in the area and the rate at which the ground water and LNAPL migrate, it may take several months for a significant amount of LNAPL to accumulate. Periodically, as appropriate, accumulated LNAPL would be siphoned out of the trenches and transported off-site for disposal. LNAPL-contaminated water which may accumulate in the trenches would also be removed and treated, if necessary, prior to disposal to the POTW. The type of system used to treat the water would depend on the types of contaminants at levels requiring treatment. Examples of water treatment systems that might be used include granular activated carbon and air stripping. Collection of LNAPL and water from the trenches would occur periodically over a 30-year period.

Institutional controls would include land use restrictions and deed restrictions relating to

subsurface excavation, including installation of water wells. These institutional controls would apply to those properties on which dissolved and non-dissolved LNAPL contamination exists in the aquifer from the site, and may extend to surrounding properties as necessary to facilitate remedy implementation and to protect the public from contact or ingestion of the LNAPL contaminants. In addition, RCRA monitoring requirements would have to be followed because a RCRA waste would be left on site.

Long-term operation and maintenance would include upkeep of the site fence and trenches, groundwater monitoring, and mowing and general maintenance.

Contingency funding of $1,300,000 for the phase II remedy is included in the costs shown below because the estimated percentage of LNAPL recovery is only 10 to 20%.

Capital costs	
Predesign investigation	$ 400,000
Construction of remedy	$1,680,000
Groundwater monitoring and other common activities	$ 315,000
O&M costs	
Construction of remedy	$ 520,000
Groundwater monitoring and other common activities	$1,685,000
Total present net worth of capital and O&M costs for phase I:	$4,600,000
Contingency funding for phase II remedy:	$1,300,000
Estimated present net worth cost of alternative 2:	$5,900,000
Estimated time to construct phase I	6 months
Estimated time to construct phase II	6 months
Estimated cleanup time for phase I and II:	30 years
Estimated percentage LNAPL recovered:	10 to 20%

ALTERNATIVE 5A -- FENCING, INSTITUTIONAL CONTROLS, AND LNAPL CONTAINMENT AND PARTIAL RECOVERY VIA ACTIVE COLLECTION

Alternative 5A contains the LNAPL by active collection so that it does not migrate beyond the current plume boundaries and does not migrate into the Des Plaines River. The major elements of alternative 5A include:

- LNAPL containment and periodic active recovery over a 10-year period using four trenches
- Off-site disposal of collected LNAPL at a permitted incineration facility

Additional elements of alternative 5A are:

- Collection of LNAPL-contaminated water that accumulates in the four containment trenches, treatment if necessary, and disposal via public sewer to a local POTW
- Site fencing and institutional controls
- Evaluation of the appropriate action for addressing any remaining aquifer contamination in phase II cleanup and subsequent implementation of phase II
- Long-term operation and maintenance

Four covered trenches would be constructed as described in alternative 2 (see Figure 14). Instead of relying on natural forces to allow LNAPL to accumulate in the trenches, as in alternative 2, ground water and LNAPL would be actively pumped for several months of the year to induce flow into the four trenches. Periodically, as appropriate, accumulated LNAPL would be siphoned out of the trenches and transported off-site for disposal. Water which may have accumulated in the trenches will also be removed and treated, if necessary, prior to disposal to the POTW. As indicated for alternative 2, the type of system used to treat the water would depend on which contaminants were present at levels requiring treatment. Water treatment systems that might be used include granular activated carbon and air stripping. Collection of LNAPL and LNAPL- contaminated water from the trenches would occur periodically over a 10-year period.

Contingency funding of $1,300,000 for the phase II remedy is included in the costs shown below because the estimated percentage of LNAPL recovery is only 30 to 50%.

Capital and O&M costs	
Predesign investigation	$ 800,000
Construction of remedy	$ 2,700,000
Groundwater treatment system (including 10 years of O&M)	$ 3,200,000
Total present net worth of capital and O&M costs for phase I:	$ 8,700,000
Contingency funding for phase II remedy:	$ 1,300,000
Estimated present net worth cost of alternative 5A:	$10,000,000
Estimated time to construct phase I:	6 months
Estimated time to construct phase II:	6 months
Estimated percentage LNAPL recovered:	30 to 50%
Estimated cleanup time phase I:	10 years
Estimated cleanup time phase II:	30 years

ALTERNATIVE 9A -- FENCING; INSTITUTIONAL CONTROLS; LNAPL EXCAVATION; ON-SITE S/S TREATMENT AND DISPOSAL OF LNAPL-

CONTAMINATED MATERIAL; AND OFF-SITE LNAPL TREATMENT

Alternative 9A removes all of the LNAPL from the soils and the aquifer by physical excavation of the LNAPL-contaminated soil and aquifer materials, and by recovery of liquid LNAPL. Liquid non-dissolved LNAPL will be treated off-site at a permitted incineration facility complying with RCRA and TSCA. LNAPL contaminated waters will be removed and treated prior to disposal to the POTW. LNAPL contaminated materials will be stabilized, and the stabilized material will be disposed within the original facility boundaries in a RCRA corrective action management unit (CAMU). The major elements of alternative 9A include:

- Excavation and on-site treatment of LNAPL-contaminated soil, gravel, and bedrock via solidification/stabilization to be completed in approximately one year
- On-site disposal of treated soil, gravel, and bedrock into a CAMU
- Liquid non-dissolved LNAPL recovered during excavation would be treated off site at a RCRA and TSCA permitted incineration facility

Additional elements of alternative 9A are:

- Collection of water during excavation, treatment if necessary, and disposal of collected water via a public sewer to a local POTW
- Site fencing and institutional controls
- Evaluation of the post-phase I conditions and of appropriate alternatives for addressing any remaining aquifer contamination
- Long-term operation and maintenance

For alternative 9A, LNAPL would be removed from the aquifer and disposed off site, and LNAPL-contaminated material would be dug out, treated on-site, and placed back on the Lenz Oil property north of Jeans Road (see Figure 15). The treated material would be placed on the Lenz Oil property in a CAMU. For this alternative, soil overlying the LNAPL-contaminated areas would be excavated. If sampling showed that the soil was not contaminated, it would be stockpiled for use later in grading and filling activities. If sampling results indicated the soil was contaminated, the soil would be placed in the treatment system. The same steps would be taken for LNAPL-contaminated gravel and bedrock, and excavation would continue until all LNAPL and LNAPL-contaminated soil, gravel, and bedrock was removed and treated. The criteria for determining when excavation is complete will be based on the removal of all contaminated source materials, soils, gravel and bedrock, and will also be based on excavation of material containing PCBs at unacceptable risk levels. Only soils, gravel and bedrock which do not pose a risk to human health or the environment will be allowed to remain in the ground at the completion of excavation.

To carry out the excavation activities required for this alternative, during the approximately seven to twelve months of excavation, Jeans Road would have to be rerouted to traverse the northern edge of the Lenz Oil property, or traffic would have to be redirected to an alternate route. In addition, several storage buildings east of the house on the south side of Jeans Road, as well as a portion of Jeans Road itself, would have to be removed and replaced later, and the resident in the house on the south side of Jeans Road would have to be relocated, and the house vacated either temporarily or permanently. Costs for temporarily or permanently relocating the resident are included as part of the cleanup expense.

Depending on how extensively the LNAPL has migrated around and underneath the foundation of this residence, the structure may have to be demolished to allow for recovery of all the LNAPL-contaminated material. If demolition is necessary, the resident would be permanently relocated. Alternatively, if the LNAPL has migrated a limited distance underneath the foundation of the residence, it may be possible to employ an alternate technology, such as a vacuum extraction system, to adequately remove the LNAPL from beneath the residence without having to resort to demolition of the structure. In all cases where excavation is part of the cleanup plan, U.S. EPA would be in close communication with the resident south of the Lenz Oil property and with other nearby residents.

The type of treatment that is part of alternative 9A is solidification/stabilization and off-site incineration. Liquid LNAPL recovered during excavation would be treated. It would be transported to an off site, permitted incineration facility. However, all LNAPL-contaminated soil, gravel, and bedrock would be placed in an on-site treatment unit which would "mix" the material with suitable binding agents, such as Portland cement, fly ash, lime, or combinations of several different agents. The ideal mix of stabilizing agents would be determined during predesign studies by combining contaminated material from the site with a number of different stabilizing agents in a test laboratory and testing the resulting material for stability and other characteristics. One of the tests that the treated material will have to pass is the toxicity characteristic leaching protocol. Upon mixing with the stabilizing matrix shown to be most effective, the LNAPL-contaminated material will bind with and adhere to the stabilizing agents to form a solid, non-leaching cement-like material. The addition of binding agents will result in a 30% increase in volume.

After the LNAPL-contaminated material is treated in the on-site treatment unit, the stabilized material would be placed on the Lenz Oil property north of Jeans Road into a CAMU. A CAMU is a waste management unit subject to very specific requirements under RCRA which governs hazardous waste management practices for operating commercial and industrial facilities that handle hazardous wastes. In constructing the CAMU on the Lenz Oil property, all appropriate requirements would be followed to ensure that the CAMU would serve as a stable and suitable unit for storing the stabilized material. The type of cap that is appropriate for covering the CAMU will include: 1) a

frost protection layer including top soil and vegetation; 2) a drainage layer; 3) a barrier layer consisting of a compacted clay layer or a 40 ml very low density polyethylene liner over either a clay liner or a 2 foot compacted clay layer.

During the construction activities, non-dissolved LNAPL that accumulates in excavated areas would, periodically as appropriate, be pumped out of the excavation and transported off-site for disposal. In addition, dissolved LNAPL contaminated water which may accumulate in the excavations would also be periodically removed as appropriate and treated on-site as necessary prior to disposal to the POTW. The type of system used to treat the LNAPL contaminated water would depend on the types of contaminants present at levels requiring treatment. Contingency funding of $1,300,000 for the phase II remedy is not included in the costs shown below because 9A would remove essentially all of the non-dissolved LNAPL and would significantly alter the aquifer conditions.

Capital and O&M Costs	
Predesign investigation	$ 500,000
Construction of remedy	$ 8,500,000
Groundwater monitoring and other common activities	$ 2,000,000
Contingency cost for construction of cap on CAMU	$ 1,500,000
Total capital and O&M costs for phase I:	$12,500,000
Contingency funding for phase II remedy	$ 0
Estimated present net worth cost of alternative 9A:	$12,500,000
Estimated time to construct phase I:	6 months
Estimated percentage LNAPL recovered:	90 to 99%
Estimated cleanup time phase I:	1 year
Estimated cleanup time phase II:	5 years

ALTERNATIVE 9B -- FENCING; INSTITUTIONAL CONTROLS; LNAPL EXCAVATION; ON-SITE LTTD TREATMENT AND DISPOSAL OF LNAPL-CONTAMINATED MATERIAL; OFF-SITE LNAPL TREATMENT

Alternative 9B removes all of the LNAPL from the soils and the aquifer by physical excavation of the LNAPL-contaminated soil and aquifer materials, and by recovery of liquid LNAPL. Liquid LNAPL will be treated off-site at a permitted incineration facility complying with RCRA and TSCA. LNAPL contaminated materials will be treated, and the treated material will be disposed within the original facility boundaries in a CAMU (see Figure 15). LNAPL contaminated waters will be removed and treated prior to disposal to the POTW. The major elements of alternative 9B include:

- Excavation and on-site treatment of LNAPL-contaminated soil, gravel, and bedrock using low temperature thermal desorption to be completed in

approximately one year

- On-site disposal of treated soil, gravel, and bedrock into a CAMU
- Liquid LNAPL recovered during excavation would be treated off site at a RCRA and TSCA permitted incineration facility

Additional elements of alternative 9B are:

- Collection of contaminated water during excavation, treatment if necessary, and disposal of collected water via a public sewer to a local POTW
- Site fencing and institutional controls
- Evaluation of the post-phase I conditions and of appropriate alternatives for addressing any remaining aquifer contamination
- Long-term operation and maintenance

Like alternative 9A, alternative 9B involves physically excavating all LNAPL and LNAPL-contaminated material from the site, sending liquid LNAPL off-site for treatment at a permitted facility, treating LNAPL contaminated waters on-site prior to discharge to the POTW, treating the remaining material on-site, and placing the treated material on the Lenz Oil property in a CAMU. The excavation would proceed as described for alternative 9A and, like alternative 9A, would require at least temporarily, and possibly permanently, relocating the resident in the house to the south of the Lenz Oil property. Like alternative 9A, this alternative would also involve either rerouting Jeans Road or directing traffic to a different route.

Alternative 9B differs from alternative 9A in the type of treatment that would be used for the LNAPL contaminated excavated material. For alternative 9B, instead of solidifying or stabilizing the excavated material, the material would be placed in an on-site low temperature thermal desorption, or "LTTD," treatment unit. In LTTD, waste material is heated to very high temperatures causing the contaminants to physically separate from the soil, gravel, or bedrock. Combustion of the material is minimized by using a gas other than oxygen in the heating chamber. The vapors arising as the material is heated must be treated further. Typically, this is done by first cooling the vapors and then separating the liquids that condense out from the gases. The gaseous stream is then routed to a treatment unit, such as an afterburner, where any residual contaminants are burned. The liquid stream typically must be sent off site to a permitted incinerator due to the higher concentrations of contaminants it may contain.

The treated soil from the process would be disposed of on the Lenz Oil property into a CAMU, as with alternative 9A.

Contingency funding of $1,300,000 for the phase II remedy is not included in the costs shown below because 9B would remove essentially all of the non-dissolved LNAPL and would significantly alter the aquifer conditions.

Capital and O&M Costs	
Predesign investigation	$ 600,000
Construction of remedy	$14,500,000
Groundwater monitoring and other common activities	$ 2,000,000
Contingency cost for construction of cap on CAMU	$ 1,500,000
Total present net worth of capital and O&M costs for phase I:	$18,600,000
Contingency funding for phase II remedy	$ 0

Estimated present net worth cost of alternative 9B:	$18,600,000
Estimated time to construct phase I:	6 months
Estimated percentage LNAPL treated:	90 to 99%
Estimated cleanup time phase I:	1 year
Estimated cleanup time phase II:	5 years

ALTERNATIVE 10: FENCING; INSTITUTIONAL CONTROLS; VACUUM ENHANCED RECOVERY OF LNAPL AND VOCs IN SUBSURFACE SOILS; OFF-SITE LNAPL TREATMENT

Alternative 10 removes a large amount of the LNAPL from the subsurface and contain the remainder of the LNAPL. The LNAPL would be removed by using vacuum-enhanced recovery. The major elements of alternative 10 include:

- Vacuum-enhanced pumping of the aquifer to recover LNAPL over an approximately 5-year period using approximately thirty below-ground extraction wells
- Off-site treatment of collected LNAPL at a permitted incineration facility
- Extraction, via the same wells mentioned above, and treatment of contaminant vapors from subsurface soils

Additional elements of alternative 10 are:

- Site fencing and institutional controls
- Evaluation of the appropriate action for addressing any remaining groundwater contamination in phase II cleanup and subsequent implementation of phase II
- Long-term operation and maintenance
- Collection of dissolved LNAPL and waters during extraction, treatment if

necessary, and disposal of collected water via a publicly owned sewer to a POTW

For the vacuum-enhanced recovery approach, approximately 30 extraction wells would be installed on the site, and enhanced pumping of LNAPL from the aquifer would occur by applying a vacuum to the wells (see Figure 16). At the same time, contaminant vapors from subsurface soil, sometimes called "soil gas," would be pumped out and treated. Contaminated water that is extracted in the process would be separated from the LNAPL and then either discharged directly, or after treatment if needed, to a local POTW. Applying a vacuum to the wells will also result in the enhanced removal of VOCs evaporating from the subsurface soils. In addition, the increased air flow through the aquifer system due to the vacuum may encourage bacterial growth and result in biodegradation of some of the contaminants. Air injection wells between the vacuum enhanced recovery wells will also be installed, unless predesign studies show that no benefit is provided to further increase the air flow in the aquifer.

The estimated percentage of LNAPL that would be recovered using this approach ranges from 50 to 80%, and depends in part on soil types and subsurface properties. This is one of the alternate, or contingent, remedies that will be studied during predesign.

Under alternative 10, traffic along Jeans Road would only have to be temporarily rerouted, if at all, during the construction of the extraction wells. The resident(s) in the house to the south of Jeans Road might have to be temporarily relocated during part of the construction, but permanent relocation would not be necessary. Some of the storage buildings to the east of the house might have to be torn down and replaced once the extraction period is over, but the house would not have to be demolished.

Contingency funding of $1,300,000 for the phase II remedy is included in the costs shown below; however, if alternative 10 is able to adequately treat the contamination, this funding may not be necessary. If this funding is not necessary, then the estimated present net worth cost for alternative 10 would be $8,000,000 instead of $9,300,000.

Capital and O&M Costs	
Predesign investigation	$ 600,000
Construction of remedy	$5,300,000
Groundwater monitoring and other common activities	$2,100,000
Total present net worth of capital and O&M costs for phase I:	$8,000,000
Contingency funding for phase II remedy	$1,300,000
Estimated present net worth cost of alternative 10:	$9,300,000
Estimated time to construct phase I:	1 year
Estimated time to construct phase II:	6 months
Estimated percentage LNAPL recovered:	50 to 80%

Estimated cleanup time phase I:	5 years
Estimated cleanup time phase II:	30 years

ALTERNATIVE 11: FENCING; INSTITUTIONAL CONTROLS; IN-PLACE LOW TEMPERATURE THERMAL DESORPTION

Alternative 11 treats the majority of the LNAPL in the subsurface using low temperature thermal desorption (LTTD). The major elements of alternative 11 include:

- In-place treatment of LNAPL and LNAPL-contaminated soil, gravel and bedrock by a combination of "thermal wells" and "thermal blankets" constructed on site
- Extraction and treatment of contaminant vapors from subsurface soils

Additional elements of alternative 11 are:

- Collection of ground water extracted during the process, treatment if necessary, and disposal via a public sewer to a local POTW
- Site fencing and institutional controls
- Evaluation of the appropriate action for addressing any remaining aquifer contamination in phase II cleanup and subsequent implementation of phase II
- Long-term operation and maintenance

In this alternative, the same technology as described in alternative 9B, low temperature thermal desorption, or "LTTD," would be used. The difference between alternative 9B and alternative 11, however, is that for alternative 9B, LTTD is performed *ex situ*, which means in a treatment unit above the ground, while for alternative 11, LTTD is performed *in situ*, which means the material is treated in place. Instead of excavating the LNAPL-contaminated material prior to treating it, thermal wells would be placed throughout the site to heat the material in place (see Figure 17). The compounds that are separated from the subsurface due to the high temperatures are captured via the thermal wells. As described under alternative 9B, the captured vapors would then be condensed, with the gas stream being routed to a treatment unit such as an afterburner and the liquid stream being sent off site for appropriate disposal. No soil or other uncontaminated material would have to be moved either before or after the treatment.

The estimated amount of LNAPL that would be treated using this approach ranges from 90 to 99%. This technology was developed fairly recently and has not been widely tested at hazardous waste sites and is one of the alternate, or contingent, remedies that will be studied during predesign.

Under alternative 11, for much of the one-year construction period, Jeans Road would have to be rerouted to traverse the northern edge of the Lenz Oil property or traffic would

have to be redirected to an alternate route. The resident in the house to the south of Jeans Road might have to be temporarily relocated during part of the construction, but permanent relocation would not be necessary. It is likely that the storage buildings to the east of the house would have to be torn down and later replaced, but the house would not have to be demolished.

Contingency funding of $1,300,000 for the phase II remedy is included in the costs shown below; however, if alternative 11 is able to adequately treat the contamination, this funding may not be necessary. If this funding is not necessary, then the estimated present net worth cost for alternative 11 would be $8,600,000 instead of $9,900,000.

Capital and O&M Costs	
Predesign investigation	$ 600,000
Construction of remedy	$6,000,000
Groundwater monitoring and other common activities	$2,000,000
Total present net worth of capital and O&M costs for phase I	$8,600,000
Contingency funding for phase II remedy	$1,300,000
Estimated present net worth cost of alternative 11:	$9,900,000
Estimated time to construct phase I:	1 year
Estimated time to construct phase II:	6 months
Estimated percentage LNAPL treated:	90 to 99%
Estimated cleanup time phase I:	5 years
Estimated cleanup time phase II:	30 years

B. Phase II

In developing the basic approaches for the overall cleanup for the Lenz Oil site, U.S. EPA had to evaluate ways of treating, restoring, or otherwise addressing any remaining aquifer contamination after completion of phase I LNAPL cleanup activities. The FS Report, FS addendum, and supplemental information prepared for the site identified and evaluated alternatives to address site threats or potential threats. However, the considerations and appropriateness of some phase II alternatives may significantly depend upon post-phase I site conditions, which are not discernable at this time. For example, the extent of removal of non-dissolved LNAPL from the site may impact the ability to naturally attenuate remaining dissolved LNAPL. Consequently, all phase I alternatives except alternative 1, "no action", require a detailed evaluation of post-phase I site conditions, and provide the opportunity to modify or amend the recommended phase II remedy in this ROD.

All of the alternatives described below relate to phase II cleanup only. The phase I

alternative I providing for no action, does not change in scope or cost under phase II. All other phase I alternatives include fencing, institutional controls including deed restrictions, and periodic maintenance and monitoring as required by CERCLA. Phase II activities are as follows:

Alternative II-1 - Fencing, Institutional Controls, and Monitoring.

The purpose of alternative II-1 is to preclude human and environmental receptor contact with residual LNAPL contamination until such time as the contamination no longer presents an unacceptable risk to humans and the environment. The major elements of alternative II-1 include:

- Fencing as necessary to preclude human and environmental contact to contaminated areas
- Institutional controls
- Monitoring
- Long-term operation and maintenance

Institutional controls would include land use restrictions and deed restrictions to preclude groundwater usage and excavating in or exposing contaminated material.

The primary objectives of the long-term monitoring would be to evaluate the degree and extent of aquifer contamination, and contaminant trends. In particular, the monitoring would evaluate the aquifer and related soils to determine whether the contaminants are increasing or decreasing within the aquifer, and whether the contamination is migrating beyond the current plume boundaries, including migrating in a particular direction such as toward the Des Plaines River. The monitoring, sampling and analysis would be done on a periodic basis. The monitoring program would include the development of a continuous monitoring record; identification of select locations to monitor changes in both the horizontal and vertical extent of contamination; sampling frequency; and identification and monitoring of areas containing higher contaminant concentrations.

Capital cost:	0
Groundwater monitoring and other common activities:	$133,000
Estimated present net worth over 30 years:	$1,250,000
Estimated time to implement:	None

Alternative II-2 - Fencing, Institutional Controls, Monitoring, and Groundwater Extraction System

Alternative II-2 remediates the LNAPL contaminated groundwater. The major elements of alternative II-2 include:

- Fencing as necessary to preclude human and environmental contact to contaminated areas
- Institutional controls
- Monitoring
- Aquifer water extraction system
- Long-term operation and maintenance

Institutional controls would include land use restrictions and deed restrictions to preclude groundwater usage.

The primary objectives of monitoring would be to monitor the aquifer water quality and related soils, ensure the LNAPL contaminated waters do not migrate beyond the current plume boundaries and ensure that the contamination does not migrate into the Des Plaines River. Monitoring, sampling and analysis would be done on a periodic basis.

The water extraction system would consist of installing water extraction wells in the aquifer area where LNAPL contamination exceeding cleanup standards exists. Contaminated water would then be pumped from the extraction system to the POTW. On-site treatment would be required only if pretreatment standards were exceeded during this action.

Estimated cost of water extraction:	$1,300,000
Annual maintenance and monitoring cost:	$129,000
Estimated time to implement:	6 months
Estimated cleanup time:	30 years

VIII. COMPARATIVE EVALUATION OF ALTERNATIVES

The NCP requires that the alternatives be evaluated against nine evaluation criteria for remedy selection. This section summarizes the relative performance of the alternatives by highlighting the key differences among the alternatives in relation to these criteria. The nine evaluation criteria are categorized as: (1) threshold criteria; (2) primary balancing criteria; and (3) modifying criteria. This section of the ROD describes each criterion and compares each remedial alternative against each criterion.

DESCRIPTION OF NINE CRITERIA

(1) Overall Protection of Human Health and the Environment

This criterion addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced or controlled through treatment and engineering controls. The

selected remedy must meet this criterion.

(2) Compliance with ARARs
This criterion addresses whether a remedy will meet federal and state environmental laws or justifies a waiver from such requirements. The selected remedy must meet this criterion or a waiver of the applicable or relevant and appropriate requirement (ARAR) must be obtained.

(3) Long-term effectiveness and permanence
This criterion refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

(4) Reduction of toxicity, mobility, and volume
This criterion refers to the performance of the remedy in terms of reducing the toxicity, mobility, and volume of contaminants, usually through treatment.

(5) Short-term effectiveness
This criterion refers to: (I) short-term risks to a community during implementation of an alternative; (ii) potential effects on workers engaged in implementation of the remedy; (iii) potential environmental effects of the remedial action and effectiveness of mitigative measures; and (iv) time until protection is achieved.

6) Implementability
This criterion is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7) Cost
The cost criterion includes estimated capital and O&M costs expressed in terms of net present worth.

8) Support Agency, Illinois EPA, acceptance
This criterion reflects aspects of the preferred alternative and other alternatives the Illinois EPA favors or objects to, and any specific comments regarding federal and state ARARs or the proposed use of waivers.

9) Community acceptance
This criterion refers to the public's general response to the alternatives described in the proposed plan and in the RI/FS, based on public comments received.

COMPARISON OF PHASE I ALTERNATIVES AGAINST CRITERIA

Overall Protection of Human Health and the Environment: U.S. EPA, in consultation

with Illinois EPA, has concluded that alternative 1, no action, would not ensure the overall protection of human health and the environment. The baseline risk assessment documented unacceptable potential risks in the present and future due to the site. In addition, groundwater contaminant concentration levels exceed federal maximum contaminant levels (MCLs) and other drinking water standards, which are the acceptable levels of contaminants allowed in drinking water. Alternative 1 does not meet the criterion because no remedial action would be taken and, consequently, present and future risks posed by the site would not be adequately addressed, the principal threat at the site would still be present, and further releases of contaminants to the environment would not be prevented.

The proximity of the LNAPL to the surface and the location of the LNAPL plume within a 100-year flood plain both undermine the interim protectiveness of the two remedies until the cleanup standards are achieved. In terms of achieving the objective of protection of the environment, the reliance of alternatives 2 and 5A on institutional controls to ensure that the LNAPL is not brought to the surface may indicate that the ability of these two remedies to meet this goal is limited. In alternative 2, between 80 and 90% of the LNAPL would remain in the subsurface, and in alternative 5A, between 50 and 70% of the LNAPL would remain in the subsurface as a continuing source of LNAPL to groundwater. Consequently achieving the cleanup standards through Alternatives 2 or 5A can not be estimated at this time, and will depend upon the effectiveness of Phase II activities.

Interim measures required by Alternatives 2 and 5A would be protective of human health as long as the institutional controls relating to restricting contact with the subsurface and prohibiting installation of wells in the area are strictly enforced.

Alternatives 9A and 9B, and possibly alternatives 10 and 11, would offer a greater degree of protection of human health and the environment than either alternative 2 or 5A because more of the primary site contaminant, the principal threat, would either be removed and treated, or treated in place. In addition, removing or treating a greater volume of the LNAPL increases the probability that natural attenuation of contaminants in the aquifer -- the least costly way to address any remaining aquifer contamination--will result in attainment of federal and state groundwater standards or that the standards can be achieved more expeditiously. In comparing these four alternatives, one advantage offered by alternatives 9A and 9B is that they will remove a high degree of LNAPL from the aquifer in a non-dissolved, dissolved or a contaminated material state, all of which will be treated and disposed of either on-site beyond the 100 year flood plain, or off site. With alternative 10, some amount of LNAPL will remain in the subsurface within part of the 100-year flood plain. Therefore, the effectiveness of LNAPL removal provided by alternative 10 will be important. For alternative 11, in which the contamination would be treated in place, the treated material will be partially in the 100-year flood plain. Therefore, the effectiveness of treatment provided by alternative 11 will be important.

Fencing and institutional controls applicable to all of the alternatives will minimize the present risk posed by the site until the contaminants are adequately addressed. The phase II-2 applicable to all phase I alternatives except 1, 9A and 9B will ensure that acceptable levels of contaminants in the aquifer will be achieved in the future.

Compliance with ARARs: To implement any of the remedial alternatives presented in this ROD, all relevant federal and state laws and regulations must be followed. Examples of state regulations that must be followed during the course of the remediation include chemical-specific requirements, such as those specifying the allowable levels of contaminants in drinking water aquifers and surface water bodies, and regulations regarding allowable noise levels. State requirements regarding construction activities, permitted hours for construction work, and work permits would also be met. If water is discharged to a local POTW, it would be treated prior to discharge to the public sewer if it did not meet the POTW's standards for discharge. Air emissions from an afterburner on an LTTD unit, a solidification / stabilization treatment system, vacuum enhanced recovery wells, or thermal wells and/or blankets would have to be monitored to ensure compliance with federal and state laws. Federal and state regulations regarding construction in a flood plain would also apply to the site since the area south of Jeans Road is part of a 100-year flood plain.

Alternatives 9A, 9B, 10 and 11 would all meet the substantive requirements of the ARARs.

Long-Term Effectiveness and Permanence: Removal and remediation of the highly-contaminated LNAPL are permanent and effective measures. Alternatives 9A, 9B, 10 and 11 show the most promise for removing the largest volume of LNAPL from the subsurface beneath the Lenz Oil site. Although excavation of bedrock in the presence of subsurface water is difficult, and complete excavation of the LNAPL may not be accomplished, the estimated removal efficiency of 90% or more of the LNAPL for both alternative 9A and the more costly alternative 9B would lead to the greatest amount of LNAPL removal. The percentages of LNAPL that could be removed by alternative 10, and treated by alternative 11, are estimated to be 50% to 80%, and 90% to 99%, respectively. By comparison, it is estimated that LNAPL removal via passive recovery (alternative 2) would range from 10% to 20%, and LNAPL removal via active recovery (alternative 5A) would range from 30% to 50%. All of the estimated percent removals are, of course, only estimates.

Alternatives 9A and 9B involve treating LNAPL-contaminated material and disposing of the material on the Lenz Oil property in a CAMU. Assuming the effectiveness of the two treatment methods are basically the same, the long-term effectiveness and permanence of alternatives 9A and 9B would depend on the adequacy of the CAMU. Although the area of the CAMU would not be within the 100-year flood plain area, if an unusual flooding incident caused the CAMU area to be inundated with water, this would likely result in a

decreased effectiveness of the remedy.

For alternative 10, the amount of LNAPL removed from the subsurface and, for alternative 11, the effectiveness of the LTTD treatment, would be critical in determining the long-term effectiveness of the two remedies. For these two alternatives, LNAPL-contaminated material may remain in the subsurface in the part of the site within the 100-year flood plain. If a 100-year flood occurs, inundation of the area with water might cause any untreated LNAPL remaining beneath the surface to shift and migrate.

Reduction of Toxicity, Mobility, or Volume of Wastes Through Treatment: Alternatives 9A, 9B, and 11, and, to a certain degree alternative 10, satisfy the statutory preference for using treatment as a principal element because they address the principal threat through treatment. Though alternative 9A would only reduce the toxicity and mobility of the contaminants in the LNAPL-contaminated materials by about 90% to 99%, the volume of the treated material would actually increase by 30%. The increase would be due to the addition of non-toxic binding agents and not to an increase in hazardous wastes; nevertheless, a greater volume of material would have to be handled. The exact degree to which alternatives 9A, 10, and 11 could reduce the mobility and toxicity of the contaminants by stabilizing them will be evaluated as part of the predesign treatability studies that will be conducted.

Alternative 10 would reduce the toxicity and volume of the contaminants via off-site treatment which will achieve about 50% to 80% reduction. At the same time, contaminant vapors from the subsurface soil, sometimes called "soil gas" would be pumped out and treated. Contaminated water that is extracted in the process would be separated from the LNAPL and then either discharged directly, or after treatment if needed, to a local POTW.

Alternatives 9B and 11 would reduce the toxicity and volume of the contaminants in the LNAPL-contaminated materials via treatment by LTTD by about 90% to 99%. The LTTD process uses high temperatures to separate the contaminants from the soil (or gravel or bedrock). These contaminants would then either be destroyed in an appropriate treatment unit or sent off site for treatment. In terms of volume of LNAPL removed or treated, alternatives 9A, 9B and 11 are the most effective.

Short-Term Effectiveness: The majority of LNAPL recovery under alternatives 2, 5A and 10, would occur shortly after the remedy was constructed. The amount of LNAPL recovered would diminish over time. In addition, due to the use of trenches in alternatives 2 and 5A, and groundwater extraction in alternatives 5A and 10, negative short-term impacts due to these alternatives would be minimal. However, the trenches and extraction wells would be present on the site for a number of years. For alternative 2, the trenches would remain in place for at least 30 years; for alternative 5A, the trenches would remain in place for at least 10 years; and for alternative 10, the extraction wells

would remain in place for at least 5 years. Because the trenches would be sealed and the wells would be locked, short-term risks due to these alternatives should be minimal.

Under alternatives 9A, 9B and 11, the majority of the remediation activities would be completed over a period of about seven months to a year once on-site construction began. The short duration for constructing these alternatives and the continual presence of either contractors or site security during the work would reduce the short-term risk to residents and potential trespassers during remedial construction. However, the two alternatives involving excavation, 9A and 9B, produce the greatest chance that contaminants could be emitted into the air and migrate off-site. Alternatives 9A and 9B also entail the greatest risk of direct exposure to construction workers or trespassers.

During construction of alternatives 9A, 9B, and 11, potential risks to on-site workers, nearby residents, and the environment would be addressed by monitoring air emissions during all excavation activities and using engineering control measures, such as periodic watering, to control dust. Fencing around the site would be maintained to minimize the chance for trespassers to come into contact with hazardous substances. If the excavation area in alternatives 9A and 9B was not secured or sealed on a daily basis, security professionals might be hired to monitor the site during non-working hours.

Alternatives 9B and 11, which involve heating the LNAPL-contaminated material, could result in releases of VOCs to the air. For each of these alternatives, a comprehensive air monitoring program would be implemented.

Implementability: Alternatives 2, 5A, and 10 are the most easily engineered and implemented of the alternatives considered. None of these three alternatives are very invasive or require extremely complex equipment.

The equipment for treatment using solidification/stabilization in alternative 9A is available and technically proven. Alternatives 9A and 9B would entail excavation of gravel and possibly bedrock, which may prove to be extremely difficult. The shallow water table and correspondingly shallow LNAPL layer at the Lenz Oil site allow excavation to be considered a technically feasible and cost-effective way to address the principal threat. However, the degree to which the LNAPL has migrated into bedrock will not be fully known until excavation starts. The implementability of excavating LNAPL-contaminated bedrock will depend on how fractured or intact the bedrock is and on bedrock density. If the bedrock is very competent, excavation may be very difficult, if it is possible at all. Another potential implementation problem for excavation is the possible need to manage large volumes of water due to the shallow water table.

The shallow water table could also cause implementation problems for alternative 11. The success of the LTTD treatment will require dewatering the area containing the LNAPL-contaminated material. If the area is not dewatered, excessive costs might be

incurred due to heat loss to vaporizing water, instead of using the heat to treat the contaminated material.

In terms of legal issues related to implementability, the use of a CAMU for disposal of the treated LNAPL-contaminated material in alternative 9A carries the possibility of changes to the rules and requirements governing CAMUs in the near future. Depending on what changes are made, using a CAMU as part of the phase I remedy for the Lenz Oil site may become non-viable. This would be a possibility, for example, if the requirements for a CAMU were revised such that the approach in alternative 9A would not meet the requirements or such that the costs of meeting the requirements would render alternative 9A no longer cost-effective. If changes to the CAMU rule rendered alternative 9A non-viable, and if neither of the alternate approaches were demonstrated to be effective at the site, U.S. EPA would have to evaluate other approaches for addressing the site and document its decision either in a ROD amendment or an explanation of significant differences.

Cost: All alternatives include the cost of evaluating the post-phase I site conditions, providing for institutional controls, and limiting access. Except for alternatives 1, 9A and 9B, the cost of each of the alternatives includes a contingency of $1.3 million for addressing the potential for residual dissolved LNAPL contamination in phase II. Because alternatives 9A and 9B would remove essentially all of the non-dissolved LNAPL and would significantly alter the aquifer conditions, no phase II may be required. Therefore, the $1.3 million is not included as a contingency in the cost for these two alternatives. The cost for each of these alternatives, however, does include a contingency of $1.5 million for construction of the CAMU. This contingency cost was estimated for the case where the most stringent requirements would be called for, i.e., constructing a CAMU to specifications that would meet RCRA Subtitle C requirements. Because of the known effectiveness of the treatment method used in alternative 9B, LTTD, it is likely that a much less costly CAMU would be required here, which would mean that the estimated cost for alternative 9B would be closer to $17.1 million than $18.6 million.

Alternative 2, which would cost an estimated $5.9 million, is the least expensive of the alternatives. Alternative 9B, which would cost an estimated $18.6 million, is the most costly of all the alternatives considered. Of the recommended alternative and the two contingency alternatives, alternative 10, at $9.3 million, is the least expensive; alternative 11, at $9.9 million, is the next least expensive; and alternative 9A, at $12.5 million, is the most expensive. If the treatment technology for alternative 11 turns out to be as effective as predicted, it is possible that the majority of the phase II contingency funding would not be necessary. In this case, the estimated cost of alternative 11 would be approximately $8.6 million, and it would be the least expensive alternative of the three.

Because the unknowns at the site include the volume of LNAPL, the extent to which it has penetrated bedrock, and the condition of the subsurface, the cost of implementing

alternative 9A could be significantly different than projected. Also, the projected cost of alternative 11 could be either overestimated or underestimated due to the lack of historical cost information for the technology. The uncertainty in the estimated costs of the other alternatives should be less than for alternatives 9A and 11.

Another way to consider the costs of the alternatives and to try to compare the relative cost-effectiveness of each is to look at the cost per each 10% of LNAPL the alternative would remove (or treat, in the case of alternative 11). If the amount of LNAPL removed (or treated) by an alternative is equal to the minimum estimated percent removal (or treatment), the following "per percent" costs, in order of least costly to most costly, are obtained:

- Alternative 11 — $110,000 per every 10% of LNAPL treated
- Alternative 9A — $138,800 per every 10% of LNAPL removed
- Alternative 10 — $186,000 per every 10% of LNAPL removed
- Alternative 9B — $206,700 per every 10% of LNAPL removed
- Alternative 5A — $333,300 per every 10% of LNAPL removed
- Alternative 2 — $590,000 per every 10% of LNAPL removed

So, if each alternative is only able to remove (or treat) the minimum amount of LNAPL projected, alternative 11 would be the most cost effective alternative, followed by alternative 9A and then by alternative 10.

If the amount of LNAPL removed (or treated) by each alternative is equal to the maximum estimated percent removal (or treatment), the following "per percent" costs, in order of least costly to most costly, are obtained:

- Alternative 11 — $100,000 per every 10% of LNAPL treated
- Alternative 10 — $116,250 per every 10% of LNAPL removed
- Alternative 9A — $126,300 per every 10% of LNAPL removed
- Alternative 9B — $187,900 per every 10% of LNAPL removed
- Alternative 5A — $200,000 per every 10% of LNAPL removed
- Alternative 2 — $295,000 per every 10% of LNAPL removed

So, if each alternative is able to remove (or treat) the maximum amount of LNAPL projected, alternative 11 would be the most cost effective alternative, followed by alternative 10 and then by alternative 9A.

In both cases, the recommended alternative, alternative 9A, and the two contingency alternatives, alternatives 10 and 11, appear to be the most cost-effective cleanup approaches.

Support Agency Acceptance: The Illinois EPA has not taken a formal position regarding the remedy set forth in this ROD.

Community Acceptance: The residents in the area surrounding the Lenz Oil site have made a number of comments. The comment that arose most frequently was a recommendation that alternative 11 be implemented for phase I instead of alternative 9A. The commenters pointed out that because the estimated amount of LNAPL that alternative 9A could remove and that alternative 11 could treat was the same, 90 to 99%, the less expensive alternative, alternative 11, should be the preferred option. The commenters also pointed out that alternative 11 seems to offer a less disruptive approach and would probably result in less risk of air emissions than alternative 9A.

U.S. EPA appreciates these comments, and the other comments, received. U.S. EPA agrees that if alternative 11 can be implemented at the Lenz Oil site to a degree of LNAPL removal comparable to alternative 9A and provides benefits not found in alternative 9A, then alternative 11 will be implemented. However, as explained elsewhere in this ROD, alternatives 10 and 11 were introduced late in the FS process and minimal information about each alternative and their applicability to the specific conditions at the Lenz Oil site is known. Consequently, U.S. EPA can not recommend either alternative 10 or 11 as a "primary" alternative because we do not have sufficient documentation for that recommendation. U.S. EPA strongly supports, however, the evaluation of these two alternatives during the predesign phase and, if one of the alternate approaches can achieve the same level of protection of human health and the environment as alternative 9A while offering significant advantages, such as a lower cost and less disruption to the site, U.S. EPA will recommend implementation of the alternate approach instead of alternative 9A.

A list of the comments received during the public comment period, and U.S. EPA responses to the comments, is included in Appendix A attached to this ROD (responsiveness summary).

IX. DESCRIPTION OF THE SELECTED REMEDY AND CONTINGENT REMEDIES

Based on its complete evaluation of the data collected during the RI and subsequent studies, the alternatives discussed above, and recent U.S. EPA guidance, U.S. EPA, in consultation with Illinois EPA, has selected alternative 9A as the primary remedial alternative for phase I cleanup at the Lenz Oil site. U.S. EPA has recommended further evaluation of at least two alternate approaches, alternatives 10 and 11, both with contingent alternative II-2, during predesign to determine whether either could provide a level of protection of human health and the environment similar to that offered by

alternative 9A.

Alternative 9A is the preferred remedial alternative because potentially more of the primary site contaminant, the principal threat, would be removed and treated. In addition, removing and treating a greater volume of the LNAPL enhances the possibility of achieving the groundwater cleanup standards expeditiously, while also increasing the probability that the phase II primary remedy could be changed to a less costly alternative.

DESCRIPTION OF ALTERNATIVE 9A

The major elements that distinguish this alternative are the excavation and treatment of LNAPL-contaminated material and disposal of the treated material on-site in a corrective action management unit (CAMU).

Since wastes will be left in place on-site, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the remedial action, in accordance with CERCLA and the NCP (40 C.F.R. Part 300).

Excavation of LNAPL and LNAPL-Contaminated Material: An estimated 12,500 cubic yards of soil and weathered bedrock contaminated with LNAPL would have to be excavated and treated. Soils above the contaminated vadose zone would be analyzed and managed as clean soils and stored on-site for use as backfill. The contaminated vadose zone of unconsolidated soils and gravels would be excavated with a backhoe, and the bedrock would be broken with a backhoe-mounted pneumatic breaker and then removed using a backhoe with a bucket. Dewatering would take place throughout the excavation activity. An adsorbent material would be used in the excavation to assist in removing the LNAPL.

The excavation would be performed in stages such that several excavation cells would be present during most of the construction. One cell would contain material that was in the process of being excavated and awaiting treatment. Another cell may be reserved, if necessary, for the solidification/stabilization treatment process. Excavation would continue until all contaminated source materials, soil, gravel and bedrock was removed, until PCB levels are in compliance with TSCA regulations, and until the levels of contaminants remaining in the ground pose no unacceptable risks to human health or the environment.

Treatment of LNAPL-Contaminated Material via Solidification/Stabilization: Material would be treated either in an excavation cell or in an on-site blending unit. The excavated material would be blended with the stabilization mixture determined during predesign studies to be most effective. Samples of the stabilized material would be collected periodically and analyzed using the toxicity characteristic leaching procedure

method to confirm that minimal or no leaching of contaminants will occur.

On-Site Disposal of Treated Material in a CAMU: Pursuant to Subtitle C of RCRA, U.S. EPA may propose to designate an area on a site as a CAMU. As long as requirements for using a CAMU are adhered to, remediation waste generated at a site may be placed in the CAMU to streamline the implementation of the remedy. In the simplest terms, a CAMU is a designated waste disposal area that is prepared and constructed so that the waste disposed in the CAMU will be secure and releases to the environment will not occur. If the material excavated from the Lenz Oil site , for each constituent, meets the toxicity characteristic leaching procedure criteria and TSCA requirements for PCBs and the risk-based calculated value for that constituent, but does not meet RCRA land disposal restriction criteria after treatment, the material may be disposed of in a CAMU. The CAMU at the Lenz Oil site will be located generally in the main excavation area of the Illinois EPA removal acti... All CAMU monitoring requirements will apply, and the

CAMU shall be managed and monitored so as to minimize any future releases of waste to the environment.

DESCRIPTION OF ALTERNATIVE 10 (CONTINGENT REMEDY)

The major element that distinguishes this alternative is the use of vacuum enhanced recovery to remove the LNAPL from the subsurface. In this process, LNAPL removal would be enhanced by a vacuum-induced pressure gradient. Simultaneously, extraction and capture of VOCs arising from the vadose zone would occur. Multiple, below-ground extraction wells would be installed throughout the area of contamination, and LNAPL and soil gas would be extracted in the same process stream. The recovered LNAPL would be sent off-site to a permitted incineration facility. The soil gas would be condensed, with the liquid portion being sent off-site to an appropriate disposal facility and the vapor portion being routed to an off-gas treatment unit or afterburner. Approximately 30 extraction wells would be installed in the 2 acre area that is being remediated. In addition, approximately 60 air injection wells would also be installed. It is estimated that the vacuum enhanced recovery system would be in place and operating for a five-year period.

Since wastes will be left in place on-site, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the remedial action, in accordance with CERCLA and the NCP (40 C.F.R. Part 300).

DESCRIPTION OF ALTERNATIVE 11 (CONTINGENT REMEDY)

The major element that distinguishes this alternative is the use of *in situ* LTTD to treat

the contaminated area. This approach would involve installing approximately 30 thermal wells that would penetrate the ground throughout the contaminated area. A layer of impermeable synthetic material would cover the areas of ground between the wells to prevent volatilizing compounds from migrating through the subsurface and being emitted into the air. The thermal wells would raise the temperature of the subsurface to at least 1,100° F. Compounds that volatilize due to the high temperatures would be captured in the thermal wells. The gases would then be sent to a cooling unit. Condensate would be sent off site for appropriate disposal, and the gas stream would be routed to an afterburner or treated in some other way. No soil or other uncontaminated material would have to be moved either before or after the treatment.

Since wastes will be left in place on-site, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the remedial action, in accordance with CERCLA and the NCP (40 C.F.R. Part 300).

DESCRIPTION OF PHASE II ALTERNATIVE II-2

The major element that distinguishes this alternative is the use of extraction wells penetrating the aquifer throughout the contaminated area to extract the dissolved LNAPL, with treatment prior to discharge to the local POTW. While a period of time is being provided for after completion of phase I to assess the effectiveness of the remedy in addressing the groundwater contamination, if information indicates that the LNAPL has migrated beyond the currently known boundaries or is increasing in concentration, U.S. EPA may require immediate implementation of phase II-2. If appropriate based on such information and site conditions, the phase II alternative II-2 may be modified or changed consistent with the requirements for a ROD amendment or explanation of significant differences, including but not limited to a smaller scope pump and treat system, or a different phase II alternative.

As stated previously, the characteristics of the aquifer beneath the Lenz Oil site qualify it as a Class I aquifer, and therefore the aquifer is a potential drinking water source, according to State of Illinois regulations. After completion of phase I cleanup, a groundwater pump-and-treat system or other type of enhanced groundwater treatment system will be required if contaminants are present in ground water at levels above MCLs and Illinois groundwater quality standards under Title 35, Subtitle F, Chapter I, Part 620.

U.S. EPA will evaluate the post-phase I site conditions and any other relevant information including the effectiveness of natural attenuation after monitoring ground water for at least one year following the completion of phase I cleanup. If the data available from one year of monitoring are not sufficient to reliably analyze trends, the U.S. EPA after consulting with the Illinois EPA may modify the length of the monitoring

period.

For natural attenuation to be selected for phase II cleanup, groundwater cleanup standards for the contaminants of concern would have to be achieved within a reasonable period of time. A reasonable period of time for ground water to comply with the groundwater specific-ARARs identified in this ROD as being less than 30 years can be used as a starting point for discussion.

No costs are associated with this discussion of the phase II alternatives. The costs of the phase II remedies have already been included in the particular phase I remedy cost estimates, based upon the anticipated phase II alternative associated with the phase I action. In particular, long-term monitoring and five-year reviews, and their associated costs, are included in all phase I remedies to be implemented.

Long-term Monitoring: Long-term monitoring of ground water will be conducted to monitor and ensure the effectiveness of the remedy. Monitoring results will be evaluated annually to aid in predicting contaminant trends. The monitoring program will be developed and implemented during the phase I pre-design phase, and may be subsequently modified as appropriate to the remedial actions being conducted or the data being observed, and will include at a minimum: (1) development of a continuous monitoring-record; (2) identification of sampling locations to monitor changes in both the horizontal and vertical extent of contamination; and (3) sampling frequency and methodology.

Five-Year Reviews: During every fifth year following the start of the remedial action, U.S. EPA, in consultation with Illinois EPA, will review the effectiveness of the site remedy. If natural attenuation is the selected phase II remedy through an explanation of significant differences or ROD amendment, the five-year review will include evaluating the remedy against the following criteria to determine whether a groundwater pump-and-treat remedy, or other enhanced groundwater remedy, or other action such as further institutional controls should be implemented:

- o Comparison of existing contaminant levels throughout the plume to the groundwater ARARs identified in this ROD;
- o Trends in contaminant concentrations, if any;
- o Potential increase in time for restoration of the aquifer to more than 30 years;
- o Potential for the contaminants in the ground water to reach appropriate levels throughout the plume.

Notwithstanding an explanation of significant differences or ROD amendment selecting natural attenuation for the phase II remedy, pump-and-treat is required, or another treatment method may be necessary, if an evaluation of the above criteria indicates: (1) concentrations have not decreased; (2) concentrations do not show the potential to

decrease below the groundwater ARARs identified in this ROD in less than 30 years; or (3) the remedy will not be protective of human health and the environment.

X. STATUTORY DETERMINATIONS

The selected remedy must satisfy the requirements of Section 121 of CERCLA to:

1. Protect human health and the environment;
2. Comply with ARARs;
3. Be cost-effective;
4. Use permanent solutions and alternate treatment technologies to the maximum extent practicable; and
5. Satisfy the preference for treatment as a principal element of the remedy.

The selected primary phase I and phase II remedies for the Lenz Oil site, as described in this ROD, satisfy the requirements of CERCLA as detailed below:

1. **Protection of Human Health and the Environment:** Implementation of the selected remedies will reduce and control potential risks to human health because the primary site contaminants, non-dissolved LNAPL, dissolved LNAPL, and LNAPL-contaminated materials will be removed and treated. The selected remedies also protect the environment from the potential risks posed by contaminants by removing, stabilizing, and safely disposing of the treated LNAPL.

Institutional controls and fencing:
Institutional controls and fencing will be implemented for phases I and II to protect against direct contact with contaminants, drinking contaminated ground water at the site and to prohibit construction in the area of the site which could lead to exposure to the contamination.

Treatment of LNAPL and disposal of stabilized material in a CAMU:
Alternative 9A would require that all of the LNAPL in the subsurface be removed and properly stabilized. The material will then be disposed of in a CAMU.

Conclusion: By taking proper precautions, no unacceptable short-term risks will be caused by implementation of the remedy. The nearby residents and site workers may be exposed to noise and dust nuisances during construction. Funds to provide for temporarily relocating affected residents are included in the estimated cost for the remedy. Mitigative measures, as specified during design, will be taken to prevent and address adverse impacts to residents, site workers, and the environment.

2. **Compliance with ARARs:** With respect to any hazardous substances, pollutants or contaminants that will remain on-site, CERCLA (§121(d)(2)(A)) requires that U.S. EPA select a remedy which, at the completion of the remedial action, at least attains legally applicable or relevant and appropriate standards, requirements, criteria, or limitations. The primary phase I and phase II remedies will comply with all federal and state ARARs. The remedies will be implemented in compliance with applicable provisions of CERCLA and the NCP.

A. **Chemical-Specific ARARs:** Chemical-specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically define the extent of cleanup at a site. Also see Table 7 for a list of chemical-specific ARARs.

(1) **Ground Water:** As noted above, the aquifer underlying the site meets the criteria of a Class I aquifer, i.e., a potential drinking water source. Because it is a Class I aquifer, state and/or federal drinking water standards are ARARs for this remedy:

a. **Federal ARARs:** The Safe Drinking Water Act's maximum contaminant levels (MCLs) (40 C.F.R. Part 141).

b. **State ARARs:** The State of Illinois is authorized to administer the implementation of the federal Safe Drinking Water Act (SDWA). The State also has groundwater quality standards promulgated under IAC Title 35, Subtitle F, Chapter I, Part 620. To the extent that these state groundwater quality standards listed under 620.410 are more stringent than the federal MCLs, the state standards are ARARs for the ground water at the site.

(2) **Surface Water:** As noted above, the Des Plaines River is only several hundred feet to the southeast of the site. However, no release from the site to the river has been documented. Surface water ARARs are identified due to the site's potential releases to the river and the potential for a discharge of treated site waters.

a. **Federal ARARs:** Section 304 of the Clean Water Act (CWA) establishes Ambient Water Quality Criteria (AWQC) for protection of human health and aquatic life. The AWQC are considered relevant and appropriate at Superfund sites where a release or threat of a release is present or when remedial actions require point source discharges to surface water bodies. Because the Des Plaines River is only several hundred feet to the southeast of the site, the AWQC are ARARs for the site.

b. **State ARARs:** The State of Illinois has been authorized to implement the national pollutant discharge elimination system established under the

CWA, as specified in IAC 35, Part 309. If a pump and treat system is the phase II remedy implemented for the site, any discharge to waters of the State of Illinois will mean that the chemical specific standards of Title 35, Subtitle C, Subpart B, Section 302.208 and toxic substances standards of Section 302.210 of the IAC establishing general use water quality standards will become ARARs for the site.

(3) **Cleanup Requirements:**

a. **Federal ARARs:** PCB containing wastes at the site meet the definition of PCB remediation waste at 40 C.F.R. § 761.3. 40 C.F.R. § 761.61 et seq. specifies cleanup and disposal options for PCB remediation waste cleanup. In particular, 40 C.F.R. § 761.61© provides for risk-based cleanup and/or disposal which will not pose an unreasonable risk of injury to human health or the environment.

B. **Location Specific ARARs:** Location-specific ARARs are those requirements that relate to the geographical position of a site (see Table 8 for a list of location-specific ARARs). These include:

(1) **Protection of Wetlands:** Wetlands may exist adjacent to the Des Plaines River but no wetland contamination has been documented. Wetland ARARs are identified due to the potential impact on wetlands from remediation activities and site releases.

a. **Federal ARARs:** 40 C.F.R. Part 6 is applicable to any remedial action taken within wetlands. This ARAR requires that activities in a wetland must minimize the destruction, loss, or degradation of the wetland. In addition, affected wetlands may be restored, as appropriate. The substantive requirements of any U.S. Army Corps of Engineers permit may need to be fulfilled if remedial activities may impact a wetland.

(2) **Endangered Species Act:** Both the federal Endangered Species Act (16 U.S.C. §1531) and the Illinois Endangered Species Protection Act, Title 17 Conservative Chapter 1, Subchapter C, Pt. 1075 Illinois Administrative Rules, require that actions must be performed to conserve the endangered or threatened species located in and around the site. Remedial activities should not destroy or adversely modify the critical habitat upon which endangered species depend. Prior to conducting remedial activities, a site survey will be conducted to determine whether any endangered or threatened species may be affected by remedial activities. If such a threat exists, then the federal and/or state

statute will be relevant and appropriate to the selected remedy and will therefore be an ARAR.

(3) **Protection of Flood Plains:** Because the area of the LNAPL is within the flood plain of the Des Plaines River, state and federal regulations related to flood plains will be ARARs at the site. 40 C.F.R. Part 6, Appendix A, specifies that any action taken must minimize the potential for adverse impacts to the flood plain. 35 IAC 703.184(d)(1) contains provisions that require that an engineering analysis be done to determine hydrodynamic and hydrostatic forces expected to result at the site as a consequence of a 100-year flood.

C. **Action-Specific ARARs:** Action-specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances (see Table 9 for a list of action-specific ARARs).

(1) Federal ARARs:

a. **Pretreatment Standards:** If a pump-and-treat or similar system is required for phase II, 40 C.F.R. Part 403 and the pretreatment requirements of the POTW receiving the effluent apply to the waters.

b. **Surface Water Discharge Requirements:** 40 C.F.R. Part 122 applies to any discharge to a surface water from the site, including stormwater runoff.

c. **Corrective Action Management Unit:** Pursuant to Subtitle C of RCRA, U.S. EPA has the authority to regulate the management of hazardous waste. Placement of remediation waste into or within a CAMU does not constitute land disposal of hazardous wastes. Consolidation or placement of remediation wastes into or within a CAMU does not constitute creation of a unit subject to minimum technology requirements. At a minimum, the CAMU shall include:
   - A frost protection layer including top soil and vegetation
   - A drainage layer
   - A bottom liner consisting of compacted clay or a synthetic liner
   - A barrier layer consisting of compacted clay or a 40 ml very low density polyethylene liner over either a geosynthetic clay liner or a 2 foot compacted clay layer

d. **Land Disposal Restrictions:** The land disposal restriction treatment standards may apply prior to off-site disposal.

e. **Miscellaneous Units:** The *in situ* low temperature thermal desorption remedy may be subject to the substantive requirements under RCRA for

miscellaneous units as set forth in 40 C.F.R. Part 264, Subpart X.

f. **Incineration:** If for any of the remedies, off gases that are collected are flared or burned in an afterburner, the unit may be subject to substantive requirements for RCRA incinerators, as set forth in 40 C.F.R. Part 264, Subpart O.

g. **Disposal Requirements for PCBs:** Levels of PCBs remaining at the Lenz Oil site must comply with requirements of TSCA. Pursuant to 40 C.F.R. § 761.60(d)(2), PCBs resulting from the cleanup of spills, leaks, or other uncontrolled discharges, must be stored and disposed of in accordance with 40 C.F.R. § 761.60(a), or disposed of in accordance with an approved risk-based alternative, as is provided by 40 C.F.R. § 761.61(c). Risk-based disposal of PCB contaminated media in a CAMU unit, as specified in this ROD, is recommended by this ROD.

(2) State ARARs:

a. **Ground water:** If the pump-and-treat or other enhanced treatment system is installed (i.e., natural attenuation is not selected or is not successful), any ground water extracted shall comply with 35 IAC, Part 307 as well as 35 IAC, Part 310 which are ARARs for this site since pretreatment standards, permitting, and reporting requirements must be met for POTW discharge.

3. **Cost-Effectiveness:** Cost effectiveness is determined by evaluating the following three of the five balancing criteria to determine overall effectiveness: (1) long-term effectiveness and permanence; (2) reduction of toxicity, mobility or volume through treatment; and (3) short-term effectiveness. Overall effectiveness is then compared to cost to ensure that the remedy is cost effective.

   The selected remedy provides overall cost-effectiveness because it results in adequate long-term effectiveness and permanence. Reduction in toxicity and mobility of the principal threat is accomplished through excavating and treating LNAPL-contaminated material. No unacceptable short-term risks will be caused by implementing the remedy.

4. **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable:** The selected remedies utilize permanent solutions and alternative treatment technologies to the maximum extent practicable.

5. **Preference for Treatment as a Principal Element:** The principal threat at the site is the LNAPL. The selected phase I remedy uses treatment of the principal

threat as a primary element of the remedy. The selected Phase II remedy uses treatment of the contaminated waters as a primary element of the remedy.

SUMMARY

In summary, when the recommended alternative, alternative 9A, and the two contingent alternatives, alternatives 10 and 11, (both with contingent alternative II-2) are compared and evaluated according to the nine criteria for remedy selection listed in the NCP, it is clear that they all, to varying degrees, fulfill the objectives of the first seven of the nine criteria. Predesign treatability studies will shed more light on the relative effectiveness of the three alternatives, potential problem areas, and their potential for meeting the objective of protecting human health and the environment. All three would be carried out in such a way that the remedy would be in compliance with ARARs.

In terms of long-term effectiveness and permanence, because alternative 9A will include disposing of the treated material in an area outside of the 100-year flood plain, it may pose an advantage over alternative 10, in which some LNAPL would remain in the subsurface in the 100-year flood plain, and alternative 11, which would entail treating the contamination in place in the 100-year flood plain.

Alternative 9A would reduce the toxicity and mobility of the LNAPL through treatment; however, the volume of the material to be handled would increase by approximately 30%. The volume of LNAPL that alternative 10 could potentially address is less than that projected for alternatives 9A and 11, but treatability studies may show that it could remove more LNAPL than projected. Alternative 11 could potentially reduce the toxicity, mobility, and volume of the LNAPL almost completely through treatment.

In terms of short-term effectiveness, alternatives 9A and 11 would address the greatest volume of LNAPL within the first year the remedy is implemented. The short-term risks posed by implementing the cleanup would be greatest for alternative 9A. Alternative 10 would be in place for approximately 5 years.

The question of implementability is not completely defined for any of the three alternatives. The excavation in alternative 9A may or may not prove to be difficult. The effectiveness of vacuum enhanced recovery, in alternative 10, may or may not work in the type of soils present at the Lenz Oil site, and the implementability of alternative 11, which has only been field tested at a limited number of sites, is also an unknown. Implementability is an important factor that will be looked at during predesign studies.

Comparison of the estimated costs for each of the three alternatives is relatively easy to do; however, the uncertainty in the costs for alternatives 9A and 11 must be kept in mind. Given the current cost estimates, it appears that alternative 11 would be the most cost-

effective approach. The next most cost-effective alternative would depend on whether the minimum or maximum projected percentage for LNAPL removal is achieved. If the alternatives achieve only the minimum projected percentage removal, then alternative 9A may be more cost-effective than alternative 10. However, if each technology is able to remove the maximum projected percentage of LNAPL, then alternative 10 may be slightly more cost-effective than alternative 9A.

Table 1
Ground Water Classification Criteria

LENZ OIL SITE
LEMONT, ILLINOIS

Ground Water Class Criteria	*Site Meets Criteria*	*Site Does Not Meet Criteria*
Class II:		
The ground water does not meet the Class I Criteria defined in 35 IAC 620.210. [1]		X
The board has determined the aquifer to be a Class II aquifer.		X
The ground water is located less than 10 feet below the ground surface. [2]	X	X
Class I:		
The ground water is located within the minimum setback of a well which serves as a potable water supply and to the bottom of such well.		X
The ground water is found beneath the facility in formations that consist of unconsolidated sand, gravel, or sand and gravel that is five feet or more in thickness and contains 12 percent or less in fines.	X	
The continuous zone containing the ground water begins within 10 feet of the ground surface and extends greater than ten feet below the ground surface.	X	
The geologic material is a well documented potable resource ground water aquifer.	X	
The geologic material is a sandstone 10 or more feet thick or fractured carbonate 15 or more feet thick.	X	
The geologic material is capable of sustained ground water yield of 150 gallons per day or more from a thickness of 15 feet or less.	X	
The hydraulic conductivity of the geologic material is greater than 1.0E-4 cm/sec, obtained by using either a permeameter, slug test, or pump test.	X	

Notes:

(1) The ground water cannot be considered Class II if it meets any of the Class I ground water criteria.

(2) A surficial ground water bearing zone was encountered at various depths across the site. Depths ranged from 2 feet below ground surface near the Des Plaines River to 20 feet below ground surface in the northwestern portion of the site.

Key:

IAC = Illinois Administrative Code.
cm/sec = Centimeters per second.

Source: Table 2-2, Feasibility Study Report, ERM-North Central, Inc., February 1997

TABLE[1] 2: CONCENTRATIONS[2] OF ORGANIC CONTAMINANTS IN LNAPL, GROUND WATER, AND SOIL

	Concentration in LNAPL	Concentration in groundwater	Concentration in soil
acetone	4,200 to 500,000J[3]	150J (shallow)[4]	1600J
total 1,2-dichloroethene	39,000 to 460,000J	21 (shallow); 15 (intermediate)	13J
1,1-dichloroethane	120,000	60 (shallow); 70 (intermediate)	150
1,1-dichloroethene	4,200	50 (shallow); 3J (intermediate)	ND[5]
chloroethane	23,000	100J (shallow); 53 (deep)	ND
vinyl chloride	ND	11J (shallow); 15J (intermediate)	ND
1,1,1-trichloroethane	170,000	120 (shallow); 83 (intermediate); 2J (deep)	160
trichloroethene	86,000J	6 (shallow); 3J (intermediate)	910
tetrachloroethene	8,400	3J (shallow); 2J (intermediate)	2,800
ethyl benzene	6,900 to 2,000,000	440J (shallow)	11,000
toluene	49,000 to 4,400,000	360J (shallow)	10,000
total xylenes	4,700 to 8,500,000	2,400J (shallow)	42,000
bis(2-ethylhexyl)phthalate	660,000J ug/kg	1J	7400
2-methylnaphthalene	1,000,000 to 2,900,000	4,000 (shallow)	45,000J
Aroclor-1242	19,000J to 210,000J ug/kg	160 (shallow)	12,000
Aroclor-1260	17,000J to 42,000J	97J (shallow)	1,300

ENDNOTES FOR TABLE 2

1. Sources for the information in the table are: Remedial Investigation Report, October 1992, ERM-North Central, Inc.; Technical Memorandum No. 4, March 1995, ERM-North Central, Inc.; and Supplemental LNAPL Investigation Report, October 1997, ERM-North Central, Inc.

2. LNAPL concentrations are in ug/kg, ground water concentrations are in ug/L, and soil concentrations are in ug/kg.

3. The data qualifier "J" indicates that the result is estimated.

4. Depths of wells are indicated in parentheses.

5. "ND" indicates that the compound was not detected above detection limits.

TABLE[1] 3: CONCENTRATIONS OF INORGANIC CONTAMINANTS IN LNAPL, GROUND WATER, AND SOIL

	LNAPL (ug/kg)	Groundwater (ug/L)	Soil (mg/kg)
arsenic	1,900J[2] to 5,800J	92J (shallow)[3]; 5.4J (deep)	87J
barium	121,000 to 219,000J	1,410J (shallow); 123J (intermediate); 117 (deep)	3,060J
cadmium	11,200	1.6J	3.8
chromium	4,600J to 5,700	117J	158
cyanide	ND[4]	44.9J (shallow)	12
lead	81,000 to 150,000	564 (shallow)	909J
zinc	3,300J to 7,100J	386J (shallow); 48 (intermediate); 21.9J (deep)	654J

[1] Sources of information in the table are Remedial Investigation Report, October 1992, ERM-North Central, Inc.; Technical Memorandum No. 4, March 1995, ERM-North Central, Inc.; and Supplemental LNAPL Investigation Report, October 1997, ERM-North Central, Inc.

[2] The data qualifier "J" indicates that the result is estimated.

[3] Depths of wells are indicated in parentheses.

[4] "ND" indicates that the analyte was not detected above detection limits.

TABLE[1] 4: CONCENTRATION[2] GRADIENTS OF CONTAMINANTS IN MONITORING WELLS

	Concentration in Shallow Monitoring Wells	Concentration in Intermediate Monitoring Wells	Concentration in Deep Monitoring Wells
1,2-dichloroethene (total)	21	15	--[3]
1,1-dichloroethane	58	70	--
1,1-dichloroethene	--	--	3J[4]
chloroethane	27J	--	53
vinyl chloride	11J	15J	--
1,1,1-trichloroethane	120	83	--
trichloroethene	6	3J	--
tetrachloroethene	3J	--	--
arsenic	92J	--	5.4J
barium	1,410J	123J	117
zinc	386J	48	21.9J

[1] Source: Tables 4-33 through 4-41 in Remedial Investigation Report, Lenz Oil Site, October 1992, prepared by ERM-North Central, Inc.

[2] All concentrations are in ug/L.

[3] The symbol "--" means that the compound was not detected in the sample, or that a well was not installed at this depth.

[4] The data qualifier "J" indicates that the result is estimated.

Table 5
Summary of Potential
Carcinogenic Risks Posed by the Site

Exposure Pathway	Current Recreational: Drainage Ditch Value	Drainage Ditch Source (1)	Current Recreational: Assumed Conditions - Des Plaines River Value	Des Plaines River Source (1)	Current Trespasser Value	Current Trespasser Source (1)	Current Adjacent Resident Value	Current Adjacent Resident Source (1)	Future Residential - On Site Value	Future Residential - On Site Source (1)	Future Resident Adjacent to Site Value	Future Resident Adjacent to Site Source (1)	Future Short-Term Worker Value	Future Short-Term Worker Source (1)
Surface Water														
Dermal Contact	2E-09	Table J-2	8E-09	Table J-3	--	--	--	--	--	--	--	--	--	--
Ingestion	6E-08	Table J-1	6E-08	Table J-1	--	--	--	--	--	--	--	--	--	--
Total Excess Cancer Risk - Surface Water	6E-08	--	7E-08	--	--	--	--	--	--	--	--	--	--	--
Sediment														
Dermal Contact	6E-08	Table J-4	--	--	--	--	--	--	--	--	--	--	--	--
Total Excess Cancer Risk - Sediment	6E-08	--	--	--	--	--	--	--	--	--	--	--	--	--
Soil														
Dermal Contact (Area B)	--	--	--	--	2E-06	Table J-6	2E-06	Table J-6	4E-05	Table J-9	2E-06	Table J-6	4E-07	Table J-28
Ingestion (Area B)	--	--	--	--	4E-07	Table J-5	4E-07	Table J-5	3E-05	Table J-8	4E-07	Table J-5	3E-07	Table J-27
Inhalation, Particulates (Area B)	--	--	--	--	--	--	3E-08	Table J-11	3E-08	Table J-11	3E-08	Table J-11	--	--
Inhalation, VOC Emissions (Area B) (2)	--	--	--	--	3E-05	Table J-10	3E-05	Table J-10	3E-05	Table J-10	3E-05	Table J-10	2E-07	Table J-29
Total Excess Cancer Risk - Soil	--	--	--	--	4E-05	--	4E-05	--	1E-04	--	4E-05	--	9E-07	--
Ground Water														
Ingestion	--	--	--	--	--	--	--	--	2E-02	Table J-15	4E-04	Table J-21	--	--
Dermal Contact	--	--	--	--	--	--	--	--	3E-02	Table J-16	8E-06	Table J-22	--	--
Inhalation, Shower VOC Emissions	--	--	--	--	--	--	--	--	5E-05	Table J-17	6E-05	Table J-23	--	--
Total Excess Cancer Risk - Ground Water	--	--	--	--	--	--	--	--	5E-02	--	5E-04	--	--	--
TOTAL EXCESS CANCER RISK	1E-07	--	7E-08	--	4E-05	--	4E-05	--	5E-02	--	5E-04	--	9E-07	--

Notes:

(1) From the *Baseline Risk Assessment for the Lenz Oil Service, Inc. Site, Lemont, Illinois, Revised Final Report*, prepared by PRC Environmental Management, Inc., and dated March 25, 1993

(2) As indicated in ERM-North Central's *Comments on the March 25, 1993 Baseline Risk Assessment for the Lenz Oil Service, Inc. Site, Lemont, Illinois* (submitted to the United States Environmental Protection Agency on January 24, 1995), the risks shown in this table for inhalation of VOC emissions are unrealistic, and these risks should be less than 1E-08

Key:

-- = Not applicable

Source: Table 1-14, Feasibility Study Report, ERM-North Central, Inc., February 1997

Table 6
Summary of Potential Non-Carcinogenic Risks Posed by the Site

Exposure Pathway	Current Recreational: Drainage Ditch Value	Drainage Ditch Source (1)	Current Recreational: Assumed Conditions - Des Plaines River Value	Des Plaines River Source (1)	Current Trespasser Value	Trespasser Source (1)	Current Adjacent Resident Value	Adjacent Resident Source (1)	Future Residential - On Site Value	On Site Source (1)	Future Resident Adjacent to Site Value	Adjacent to Site Source (1)	Future Short Term Worker Value	Short Term Worker Source (1)
Surface Water														
Dermal Contact	2E-05	Table J-2	6E-05	Table J-3	--	--	--	--	--	--	--	--		
Ingestion	6E-04	Table J-1	6E-04	Table J-1	--	--	--	--	--	--				
Total Hazard Indices - Surface Water	6E-04	--	6E-04	--	--	--	--	--	--	--	--	--		
Sediment														
Dermal Contact	2E-04	Table J-4	--	--	--	--	--	--	--	--	--	--		
Total Hazard Indices - Sediment	2E-04	--	--	--	--	--	--	--	--	--	--	--		
Soil														
Dermal Contact (Area B)	--	--	--	--	5E-04	Table J-6	5E-04	Table J-6	1E-02	Table J-9	5E-04	Table J-6	3E-03	Table J-28
Ingestion (Area B)	--	--	--	--	1E-03	Table J-5	1E-03	Table J-5	2E-01	Table J-8	1E-03	Table J-5	2E-02	Table J-27
Inhalation, Particulates (Area B)	--	--	--	--	--	--	9E-09	Table J-11	9E-09	Table J-11	9E-09	Table J-11	--	
Inhalation, VOC Emissions (Area B) (2)	--	--	--	--	6E-04	Table J-7	2E-01	Table J-10	2E-01	Table J-10	2E-01	Table J-10	4E-02	Table J-29
Total Hazard Indices - Soil	--	--	--	--	2E-03	--	2E-01	--	5E-01	--	2E-01	--	7E-02	
Ground Water														
Ingestion	--	--	--	--	--	--	--	--	1E+01	Table J-15	3E-01	Table J-21	--	
Dermal Contact	--	--	--	--	--	--	--	--	2E-01	Table J-16	7E-03	Table J-22	--	
Inhalation, Shower VOC Emissions	--	--	--	--	--	--	--	--	4E-03	Table J-17	8E-04	Table J-23		
Total Hazard Indices - Ground Water	--	--	--	--	--	--	--		1E+01	--	3E-01	--	--	
TOTAL HAZARD INDICES	9E-04	--	6E-04	--	2E-03	--	2E-01	--	1E+01	--	5E-01	--	7E-02	

Notes:

(1) From the *Baseline Risk Assessment for the Lenz Oil Service, Inc Site, Lemont, Illinois, Revised Final Report*, prepared by PRC Environmental Management, Inc., and dated March 25, 1993

(2) As indicated in ERM-North Central's *Comments on the March 25, 1993 Baseline Risk Assessment for the Lenz Oil Service, Inc Site, Lemont, Illinois* (submitted to the United States Environmental Protection Agency on January 24, 1995), the risks shown in this table for inhalation of VOC emissions are unrealistic, and these risks should be less than 1E-05

Key:

-- = Not applicable

Source: Table 1-15, Feasibility Study Report, ERM-North Central, Inc., February 1997

Table 7
Chemical-Specific ARARs
(Page 1 of 2)

Constituents Detected in Ground Water during RI	Potential ARARs																		
	Illinois Ground Water Standards for Class I Aquifers[a]	Safe Drinking Water Act			Clean Water Act Freshwater Organisms[c]		Clean Water Act Human Health[c]		Illinois General Use Water Quality Standards[d]			Knollwood Wastewater Treatment Plant Pretreatment Standards[e]	RCRA				TCLP	TSCA
													HWTS[g]		UTS[h]			
		Primary MCL[a]	Secondary MCL[a]	MCLG[a]	Acute	Chronic	Water and Fish	Fish	Acute Standard	Chronic Standard	No Exceedance Standard		Wastewater	Nonwastewater	Wastewater	Nonwastewater		Disposal
	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(mg/kg)	(ug/L)	(mg/kg unless noted as mg/L TCLP[m])	(ug/L)	(mg/kg)
Inorganic																		
Aluminum			200															
Antimony		6		6	9,000[n]	1,600[n]	146	45,000										
Arsenic	50	50			360	190	0.0022	0.0175	360	190					1,900	2.1 mg/L TCLP		
Barium	2,000	2,000		2,000			1,000								1,000	5.0 mg/L TCLP	5,000	
Beryllium	4	4		4	130[n]	5.3[n]	0.0068	0.117			5,000				1,200	7.6 mg/L TCLP	100,000	
Cadmium	5	5		5	50[k]	4.3[k]	10		50[k]	4.3[k]					820	0.014 mg/L TCLP		
Calcium												260			690	0.19 mg/L TCLP	1,000	
Chromium	100	100[k]		100[k]	16[k]	11[k]	50[k]		4,910[k]	824.2[l]								
Cobalt	1,000											1,710 (Total)			2,770	0.86 mg/L TCLP	5,000	
Copper	650	TT[k]	1,000	1,300	87[k]	50[k]			87	50								
Iron	5,000		300			1,000	300					2,070						
Lead	7.5	TT[k]		0	699[k]	27[k]	50		100									
Magnesium												430			690	0.37 mg/L TCLP	5,000	
Manganese	150		50				50	100										
Mercury	2	2		2	2.4	0.012	0.144	0.146	0.5			0.5						
Nickel	100				6,650[n]	366[n]	13.4	100			1,000	2,380			150	0.025 mg/L TCLP	200	
Potassium															3,980	5.0 mg/L TCLP		
Silver	50		100		74[n]	74[n]	50				5.0	240			430	0.30 mg/L TCLP	5,000	
Sodium																		
Vanadium																		
Zinc	5,000		5,000		1300[k]	1300[k]					1,000	1,480			4,300	0.23 mg/L TCLP		
Cyanide	200	200		200	22	5.2	200[k]					25			2,610	5.3 mg/L TCLP		
															1,200	590		
Organic																		
Acetone												2,130[o]						
Benzene	5	5		0	5,300[n]		0.66	40	5,300	416			280	160	280	160[o]		
Chloroethane													160	10	160	10	500	
Chloroform		100		0	28,900[n]	1,240[n]	0.19	15.7	1,870	150					270	6		
1,1-Dichloroethane															66	6	6,000	
1,2-Dichloroethane	5	5		0	118,000[n]	20,000[n]	0.94	243	24,900	6,540					59	6		
1,1-Dichloroethene	7	7		7	11,600[n]		0.033[k]	1.85[k]	3,000	242					210	6	500	
cis-1,2-dichloroethene	70	70		70	11,600[n]										25	6	700	
trans-1,2-dichloroethene	100	100		100	11,600[n]													
Ethyl benzene	700	700		700	32,000[n]		1,400	3,280	216	17.2					54	30		
Tetrachloroethene	5	5		0	5,280[n]	840[n]	0.8	0.85	1,220	152			57	10	57	10		
Toluene	1,000	1,000		1,000	17,500[n]		14,300	424,000	8,080	644			56	6	56	6	700	
1,1,1-Trichloroethane	200	200		200			18,400	1,030,000	4,910	393			80	10	80	10		
Trichloroethene	5	5		0	45,000[n]	21,900[n]	2.7	80.7	11,700	940			54	6	54	6		
Vinyl chloride	2	2		0			2	525					54	6	54	6	500	
Xylenes (total)	10,000	10,000		10,000					1,500	117					270	6	200	
Acenaphthene					1,700[n]	520[n]			124	9.9			320	30	320	30		
di-n-Butyl phthalate					940[n]	3[n]	34,000	154,000							99	34		
Dibenzofuran															57	28		
Fluorene																		
2-Methylnaphthalene															59	34		
Naphthalene					2,300[n]	620[n]			670	68								
Phenanthrene									66	3.7					59	56		
PCBs (total)	5	0.5		0	2	0.014	7.9 E-08[p]	7.9 E-08[p]							56	56		
															10[o]	10		

Source: Table 2-1, Feasibility Study Report, ERM-North Central, Inc., February 1997

Table 7
Chemical-Specific ARARs

Sources:

A	State of Illinois - Ground Water Quality Standards, 35 IAC 620.410
B	USEPA Office of Water, 1996, *Drinking Water Regulations and Health Advisories*, EPA/822-R-96-001, February, 1996
C	USEPA National Primary and Secondary Drinking Water Regulations, 40 CFR 141.50 and 40 CFR 143.3, respectively
D	State of Illinois - General Use Water Quality Standards, 35 IAC 302.208. Organic acute and chronic standards obtained from on February 3, 1997 (as published in the Illinois Register from the period August 1, 1996 through October 31, 1996)
E	USEPA Office of Water Regulations and Standards, 1986, *Quality Criteria for Water 1986*, EPA/440/5-86-001, May (Ma - 1, 1987 update)
F	DuPage County Department of Environmental Concerns, Division of Public Works, Wastewater Local Limits, January 1992
G	USEPA Land Disposal Restrictions Hazardous Waste Treatement Standards, 40 CFR 268.40. Only the standards for wastes F001 through F005 are included
H	USEPA Land Disposal Restrictions Universal Treatment Standards, 40 CFR 268.48
I	USEPA Toxicity Characteristic Standards for Hazardous Wastes, 40 CFR 261.24
J	TSCA PCB Storage and Disposal Regulations, 40 CFR 761.60-761.75

Key:

ARARs	= Applicable or Relevant and Appropriate Requirements
RI	= Remedial Investigation.
MCL	= Maximum Contaminant Level.
MCLG	= Maximum Contaminant Level Goal
HWTS	= Hazardous Waste Treatment Standard
UTS	= Universal Treatment Standard.
TCLP	= Toxicity Characteristic Leaching Procedure
TT	= Treatment technique.
PCBs	= Polychlorinated biphenyls.
USEPA	= U.S. Environmental Protection Agency
CFR	= Code of Federal Regulations.
RCRA	= Resource Conservation and Recovery Act.
IAC	= Illinois Administrative Code.
TSCA	= Toxic Substances Control Act.
Blank Space	= No value noted.

Notes:

(1)	There are insufficient data to develop criteria; the value presented is the Lowest Observed Effect Level.
(2)	Acute and Chronic Standards were determined by using a hardness value of 540 mg/L as $CaCO_3$. The hardness is calculated as (2.497)Ca + (4.117)Mg, where the calcium and magnesium concentrations are given in mg/L. The calcium and magnesium concentrations detected in well G101L were used in the calculation because they result in the lowest hardness value
(3)	The water quality criterion shown is for chromium (VI).
(4)	The action levels for copper and lead are 1.3 mg/L and 0.015 mg/L, respectively (USEPA Office of Water, 1996, Drinking Water Regulations and Health Advisories, EPA/822-R-96-001, February, 1996)
(5)	The sum total of each toxic organic compound concentration greater than 100 ug/L must be less than 2,130 ug/L.
(6)	The criterion presented is for the 10^{-6} cancer risk level.
(7)	Contaminated soil having total PCB concentrations in excess of 50 mg/kg must be disposed in: (1) an incinerator meeting the requirements of 40 CFR 761.70, (2) a chemical waste landfill meeting the requirements of 40 CFR 761.75, or (3) an alternative method meeting the requirements of 40 CFR 761.60(e). Oil that contains more than 50 mg/kg of PCBs must be disposed in: (1) an incinerator meeting the requirements of 40 CFR 761.70, (2) a chemical waste landfill meeting the requirements of 40 CFR 761.75 if the oil is not ignitable and has been solidified, or (3) an alternative method meeting the requirements of 40 CFR 761.60(e).

Table 8
Location-Specific ARARs

Location	*Requirement*	*Citation*
Within 100-year floodplain	Facility must be designed, constructed, operated and maintained to prevent washout	40 CFR 264.18(b) 35 IAC 724.118(b)
	Engineering analysis to indicate the various hydrodynamic and hydrostatic forces expected to result at the site as a consequence of a 100-year flood.	35 IAC 703.184(d)(1)
	Structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and floodplain protection devices (e.g., floodwalls, dikes) at the facility and how these will prevent washout.	35 IAC 703.184(d)(2)
Within floodplain	Action must avoid adverse effects, minimize potential harm, and, if necessary, restore and preserve natural and beneficial values of the floodplain	Executive Order 11988, Floodplain Management (40 CFR 6, Appendix A); 92 IAC 708
Wetland	Action must minimize the destruction, loss, or degradation of the wetland	Executive Order 11990, Protection of Wetlands (40 CFR 6, Appendix A)
	Discharge of dredged or fill material into wetlands without a permit is prohibited	Clean Water Act, Section 404; 40 CFR Parts 230, 231
Area affecting stream or body of water	Action must protect fish or wildlife	Fish and Wildlife Coordination Act (16 USC 661 et seq.), 40 CFR 6.302
	Action must meet general use standards	35 IAC 302, Subpart B
Within area affecting national wild, scenic, or recreational river	Taking or assisting in an action that will have a direct adverse effect on a scenic river must be avoided	Wild and Scenic Rivers Act [16 USC 1274 et seq. Section 7(a)], 40 CFR 6.302(e)
Within area where action may cause irreparable harm, loss, or destruction of significant artifacts	Action must recover and preserve artifacts of significant scientific, prehistorical, historical, or archaeological importance	16 USC Section 469, 36 CFR Part 65
Critical habitat upon which endangered species or threatened species depends	Action must conserve endangered species or threatened species, including consultation with the Department of Interior	50 CFR Part 200, 50 CFR Part 402, 33 CFR Parts 320 to 330

Key:

CFR = Code of Federal Regulations.
USC = U.S. Code.
IAC = Illinois Administrative Code.

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Source: Table 2-5, Feasibility Study Report, ERM-North Central, Inc., February 1997

Table 9
Action-Specific ARARs
(page 1 of 11)

Action[a]	*Requirement*	*Citation*[b]	*Alternatives That May Be Impacted by ARAR*
1 Air Pollution Control • General	a. Prepare fugitive and odor emission control plan for this action	CAA Section 101, 40 CFR 52 35 IAC 201	3 - 8
	b. Establish procedures for review of construction and operation of any source that has the potential to emit criteria air pollutants. File an APEN with State to include estimation of emission rates for each pollutant expected	40 CFR 52 35 IAC 201	3 - 8
	c. Compliance with TSCA for PCB containing wastes	40 CFR 65, 70, and 75 35 IAC 721	2 - 9
	d. Ambient air quality requirements; air monitoring and reporting requirements.	Clean Air Act (42 U.S.C. 7401 7642)	2 - 9
	e. Visible emissions, fugitive dust emissions, and VOC emissions	35 IAC 212	3 - 9
	f. Primary and Secondary Ambient Air Quality Standards.	40 CFR Part 50	3 - 9
	g. Sources may be required to monitor air in site vicinity	35 IAC 201	3 - 8
	h. Emission standards for hazardous air pollutants.	40 CFR Part 61 and 35 IAC 231	3 - 8
	i. New Facilities shall not interfere with attainment of NAAQS.	40 CFR 50 40 CFR 60	3 - 8

Source: Table 2-22, Feasibility Study Report, ERM-North Central, Inc., February 1997

Table 9
Action-Specific ARARs

Action[a]	*Requirement*	*Citation*[b]	*Alternatives That May Be Impacted by ARAR*
• Air Emission Standards for Process Vents	l. Air emission standards for process vents associated with distillation, fractionation, thin film evaporation, solvent extraction, or air or steam stripping operations that manage wastes with organic concentrations of at least 10 ppmw.	40 CFR 264.1030 35 IAC 724.930	3 - 8
	m. Total organic emission limits from all affected process vents are 1.4 kg/h (3 lb/h) and 2.8 Mg/yr (3.1 tons/yr).	40 CFR 264.1032(a)(1) 35 IAC 724.932(a)(1)	3 - 8
2. Closure and Post-Closure of Hazardous Waste Treatment, Storage, and Disposal Facility (General Requirements)	a. Eliminate the need for further maintenance and control and eliminate post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products	40 CFR 264.111 35 IAC 724.211	2 - 9
	b. Removal or decontamination of all containers (i.e., liners), structures, soils and equipment contaminated or containing hazardous waste or hazardous waste residues	40 CFR 264.114 35 IAC 724.214	2 - 9
	c. Develop a written closure plan.	40 CFR 264.112 35 IAC 724.212	2 - 9

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Table 9
Action-Specific ARARs
(page 5 of 11)

Action[1]		*Requirement*	*Citation*[2]	*Alternatives That May Be Impacted by ARAR*
Excavation (Cont'd)	h	Endangered Species Act	50 CFR 200 and 402	2 - 9
	i	Industry safety and health standards	29 CFR 1910 and 1926 56 IAC 350	2 - 9
	j	Control activity to minimize dust emissions	40 CFR 51 35 IAC 212 Subpart K	2 - 9
	k	Licensing and inspection for transport of hazardous waste	35 IAC 722, 723, and 724	2 - 9
Hazardous Waste Treatment, Storage, and Disposal Facility • General Requirements	a	Obtain a detailed chemical and physical analysis of a representative sample of the wastes prior to treating, storing, or disposing of hazardous wastes and repeated as necessary to ensure that it is accurate and up to date.	40 CFR 264.13 35 IAC 724.113	2 - 9
	b	The owner or operator must prevent the unknowing entry and minimize the possibility for the unauthorized entry onto the active portion of the facility	40 CFR 264.14 35 IAC 724.114	2 - 9
	c	Facility personnel must be trained to perform their duties to maintain facility compliance with regulations and to respond effectively to emergencies.	40 CFR 264.16 35 IAC 724.116	3 - 8
	d	A construction quality assurance program is required for all surface impoundment, waste pile, and landfill units that are required to comply with 40 CFR 264.221(c) and (d), 40 CFR 264.251(c) and (d), and 40 CFR 261.301 (c) and (d)	40 CFR 264.19 35 IAC 724.119	2 - 9

Table 9
Action-Specific ARARs
(page 6 of 11)

Action[1]	*Requirement*	*Citation*[1]	*Alternatives That May Be Impacted by ARAR*
• Container Storage	e Containers of RCRA hazardous waste must be maintained in good condition, compatible with hazardous waste to be stored, and closed during storage (except to add or remove waste)	40 CFR 264.171-173 35 IAC 724.271	3, 9
	f Inspect container storage areas weekly for deterioration	40 CFR 264.174 35 IAC 724.274	3, 9
	g Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide containment system with a capacity of 10 percent of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner to prevent overflow of the containment system	40 CFR 264.175 35 IAC 724.275	3, 9
	h Keep containers of ignitable or reactive waste at least 50 feet from the facility's property line	40 CFR 264.176 35 IAC 724.276	3, 9
	i Separate incompatible materials stored near each other by a dike or other barrier	40 CFR 264.177 35 IAC 724.277	3, 9
	j At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers and liners	40 CFR 264.178 35 IAC 724.278	3, 9
• Tanks	k New tank systems must have sufficient structural integrity, compatibility with the wastes to be stored or treated, and corrosion protected to ensure that it will not collapse, rupture, or fail.	40 CFR 264.192(a) 35 IAC 724.292(a)	2, 9
	l Tanks must have secondary containment and release detection systems	40 CFR 264.193 35 IAC 724.293	2, 9

Table 9
Action-Specific ARARs
(page 7 of 11)

Action[a]	*Requirement*	*Citation*[b]	*Alternatives That May Be Impacted by ARAR*
• Tanks (Cont'd)	m. General operating requirements including (1) providing controls such as check valves and level sensing devices, and (2) applying appropriate operating practices	40 CFR 264.194 35 IAC 724.294	2 - 9
	n. Tank systems must be inspected daily for corrosion or releases of waste, every other month for sources of impressed current, and annually for the proper operation of the cathodic protection system	40 CFR 264.195 35 IAC 724.295	2 - 9
	o. Responses to leaks and spills includes removing the tank system from service immediately; containing, removing, and properly disposing of visible releases to the environment; make the appropriate notifications within the allotted time frame; and repair or close the tank system after a leak or spill.	40 CFR 264.196 35 IAC 724.296	2 - 9
• Waste Piles	p. A new waste pile must have two liners with a leachate collection and removal system immediately between the liners.	40 CFR 264.251(c) 35 IAC 724.351(c)	2 - 9
	q. Prevent runon, and control and collect runoff from a 24-hour, 25-year storm during closure and post-closure status.	40 CFR 264.251(h) 35 IAC 724.351(h)	2 - 4
	r. Consolidation in storage piles will trigger storage requirements	40 CFR 262.34, 40 CFR 268 (Subpart E) 35 IAC 262.34, 268 Subpart E	2 - 9
• Miscellaneous Units	s. Standards for miscellaneous units (long-term retrievable storage, thermal treatment other than incineration; open burning, open detonation; chemical, physical, and biological treatment units other than tanks; surface impoundments; or land treatment units) require that new miscellaneous units must satisfy environmental performance standards to protect human health and the environment. This includes, but is not limited to, the protection of ground water, surface water, and air quality, and the limitation of the potential exposure to humans, wildlife, and vegetation	40 CFR 264.600 - 603 (Subpart X) 35 IAC 724.700 - 703 (Subpart X)	5 - 9

Table 9
Action-Specific ARARs
(page 8 of 11)

Action[1]		*Requirement*	*Citation*[1]	*Alternatives That May Be Impacted by ARAR*
• Design and Construction of Treatment, Storage, and Disposal Facility	t	Because portions of the site are within a 100 year floodplain, the following are required: (1) an engineering analysis to indicate the various hydrodynamic forces expected to result at the site as a consequence of a 100 year flood, and (2) structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators), and flood protection devices (e.g., floodwalls, dikes) at the facility and how these will prevent washout	40 CFR 270.14 (b)(11)(iii) and (iv) 35 IAC 703.184(d)(1) and (2)	2 - 9
	u	Requires permit for construction of treatment facility and specifies standards for facility.	40 CFR 270 35 IAC 30 - 146	3 - 8
• Contingency and Emergency Procedures	v	Preparation of contingency and emergency procedures plans that contain: emergency response activities, emergency contact information, emergency equipment description and location at the facility, evacuation routes, and telephone numbers of local authorities and hospitals.	40 CFR Subpart D 264.50 - 56 35 IAC Subpart D	3 - 9
Hazardous Waste Generator Requirements	a	Manifest regulations for generators that transport hazardous waste off-site	40 CFR 262.20 - 23 (Subpart B) 35 IAC 722.120 - 123 (Subpart B)	2 - 9
	b	Hazardous waste pre-transport requirements include labeling, marking, placarding, and accumulation time.	40 CFR 262.30 - 34 (Subpart C) 35 IAC 722.130 - 134 (Subpart C)	2 - 9
	c	Recordkeeping and reporting requirements include hazardous waste determination analyses, storage area design and integrity certifications, inspection records, waste removal records, and signed manifests for wastes shipped off-site.	40 CFR 262.40 - 44 (Subpart D) 35 IAC 722.140 - 144 (Subpart D)	2 - 9
Land Disposal	a	Off-site solid waste land disposal units must meet the federal guidelines for the land disposal of solid wastes.	40 CFR 241 35 IAC 728	2 - 9
	b	Disposal of special waste off-site	35 IAC 808	2 - 9
	c.	A waste identified in the table "Treatment Standards for Hazardous Waste" (the table is in the cited reference) may be land disposed only if it meets the requirements found in the table.	40 CFR 268.40 35 IAC 728.140	2 - 9

Table 9
Action-Specific ARARs

Action[a]	Requirement	Citation[a]	Alternatives That May Be Impacted by ARAR
7 Land Disposal (Cont'd)	d. For characteristic wastes that are subject to treatment standards in the table "Treatment Standards for Hazardous Wastes" all underlying hazardous constituents must meet the UTSs (found in 40 CFR 268.48), Table UTS, prior to land disposal.	40 CFR 268.40(e) 35 IAC 728.140(3)	2 - 9
	e. Land disposal of RCRA hazardous waste must be in units that meet minimum technology requirements under RCRA	40 CFR 264.301 35 IAC 724.401	2 - 9
8. Noise Pollution Control	a. Regulates noise levels of certain activities.	35 IAC 902	3 - 8
9 PCBs • Spill Cleanup Policy	a. After excavation of soil above 10 mg/kg by weight of PCBs in non-restricted areas, backfilling with at least 10 inches of clean soil (i.e., soil with PCB concentrations less than 1 mg/kg) will be required.	40 CFR 761.125(c)(4)(v)	5a - 9
• Storage Prior to Disposal[b]	b. Storage facilities must be constructed: • With an adequate roof and walls. • With a floor and curb of impervious materials. • Without drain valves, floor drains, expansion joints, sewer lines or other openings. • Above the 100-year floodplain.	TSCA 40 CFR 761.65	2 - 9
	c. Storage area must be properly marked	40 CFR 761.65 (b)(3)	2 - 9
	d. No item of movable equipment used to handle PCBs that comes into contact with PCBs shall be moved from the storage area unless it has been decontaminated under 40 CFR 761.79.	40 CFR 761.65 (b)(4)	2 - 9
	e. All stored articles must be checked for leaks every 30 days.	40 CFR 761.65(b)(5)	2 - 9
	f. Containers must be dated when they are placed in storage. All PCB articles or containers must be removed and disposed of within one year of storage.	40 CFR 761.65 and 761.180	2 - 9

Table 9
Action-Specific ARARs
(page 10 of 11)

Action[1]		*Requirement*	*Citation*[1]	*Alternatives That May Be Impacted by ARAR*
• Temporary Storage	g	PCB containers containing non liquid PCBs such as contaminated soil, rags, and debris; and PCB containers containing liquid PCBs at a concentration between 50 and 500 ppm may be stored temporarily (i.e., up to 30 days) in an area that does not meet storage requirements of 40 CFR 261.65(b) provided a Spill Prevention, Control and Countermeasure Plan has been prepared for the temporary storage area in accordance with 40 CFR Part 112. In addition, each container must bear a notation that indicates that the liquid in the drums do not exceed 500 ppm PCB.	40 CFR 761.65(c)(1)(ii)	2 - 9
• Disposal of Liquid Containing PCBs	h	Treatment standards under RCRA LDRs for liquids at a concentration of or greater than 50 ppm PCBs are incineration, landfilling in a TSCA-approved chemical waste landfill if the waste is not ignitable as described in 40 CFR 761.75(b)(8)(iii), or burning in high efficiency boilers in a facility that is approved in accordance with 40 CFR 761.60(e) (i.e., that can destroy PCBs as efficiently as does a high efficiency boiler or incinerator).	40 CFR 268.42 40 CFR 761.60 40 CFR 761.70 35 IAC 728.142	2 - 9
	i	Liquid hazardous wastes containing PCBs at concentrations greater than or equal to 500 ppm must be incinerated in accordance with 40 CFR 761.60.	40 CFR 761.70	2 - 9
• Disposal of Non-liquid Waste Containing PCBs	j	Any non-liquid PCBs at concentrations of 50 ppm or greater in the form of contaminated soil, rags, or other debris shall be disposed of in a TSCA-approved incinerator or in a TSCA-approved chemical waste landfill.	40 CFR 761.60	2 - 9
• PCB Generator Requirements	k	Manifest requirements	40 CFR 761.207 and 208	2 - 9
10. Special Waste Generator Requirements	a	No person shall deliver special waste to a hauler unless the waste is accompanied by a manifest as specified in Section 35 IAC 808.122, and the hauler has a special waste hauling permit issued pursuant to 35 Ill. Adm. Code 809.	35 IAC 121(b)	5 and 6
	b	Manifest requirement.	35 IAC 122	5 and 6
11. Transportation (Off Site)	a	Transportation of non-hazardous waste off-site by truck or rail must comply with DOT regulations, including shipping containers/vehicles, record-keeping and procedures to prevent hazards	49 CFR 100-199 92 IAC 102-180	2 - 9
	b	Transportation and disposal of hazardous waste excavated from a CERCLA site will require State administrative and financial assurance, and a State manifest	35 IAC 728	2 - 9

Table 9
Action-Specific ARARs

Action[1]	*Requirement*	*Citation*[2]	*Alternatives That May Be Impacted by ARAR*
11. Transportation (Off-Site) (Cont'd)	c. No person shall haul or otherwise transport any special waste without a current valid waste hauling permit unless the hauler is exempt from the special waste hauling permit requirements.	35 IAC 809 201	2 - 9
	d. Transportation of RCRA hazardous wastes is regulated under both RCRA and DOT regulations.	40 CFR 263, 35 IAC 723 49 CFR 100-199, 92 IAC 102-180	2 - 9

Key:

APEN	=	Air Pollution Emission Notice.
ARAR	=	Applicable or Relevant and Appropriate Requirement.
CAA	=	Clean Air Act.
CERCLA	=	Comprehensive Environmental Response, Compensation, and Liability Act.
CFR	=	Code of Federal Regulations.
DOT	=	Department of Transportation.
IAC	=	Illinois Administrative Code.
LDRs	=	Land disposal restrictions.
PCB	=	Polychlorinated Biphenyl.
POTW	=	Publicly Owned Treatment Works.
RCRA	=	Resource Conservation and Recovery Act
TSCA	=	Toxic Substances Control Act.
VOCs	=	Volatile organic compounds
NAAQS	=	National Ambient Air Quality Standards.
UTSs	=	Universal Treatment Standards.

Notes:

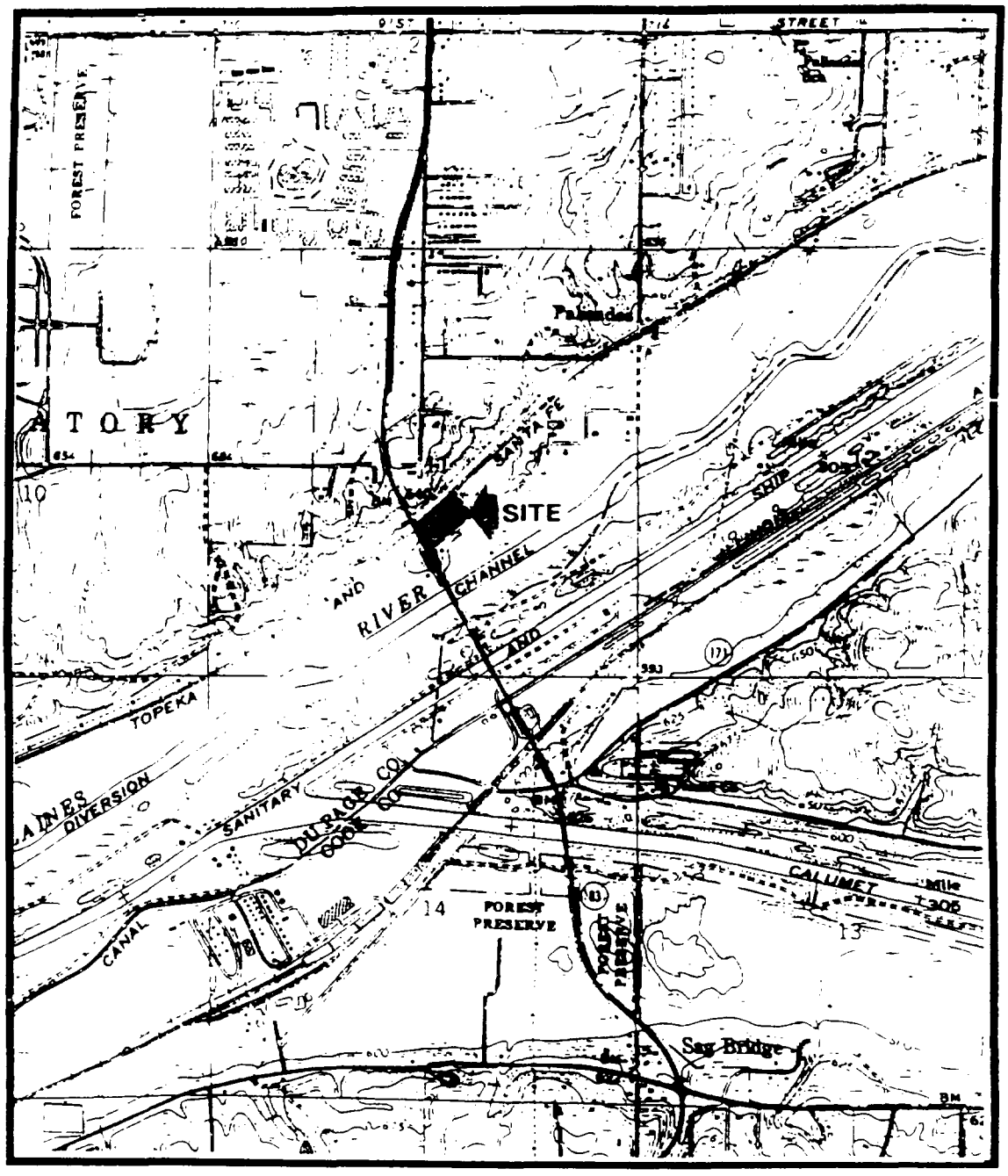
[1] Action alternatives from Record of Decision key word index

[2] Several of the ARARs that have been established by the Federal government may be covered by matching State regulations, and the State may have the authority to manage these programs.

[3] These regulations apply regardless of whether the remedial action discharges into the sewer or trucks the waste to an inlet to the sewage conveyance system located "upstream" of the POTW.

[4] Storage of PCBs at concentrations of 50 parts per million (ppm) or greater or items with PCB concentrations of 50 ppm or greater

SAG BRIDGE QUADRANGLE
ILLINOIS
7.5 MINUTE SERIES (TOPOGRAPHIC)
1963
PHOTOREVISED 1973
PHOTOREVISED 1978



SCALE 1:24000
1 .5 0 1 MILE
CONTOUR INTERVAL 5 FEET

Figure 1

Site Location

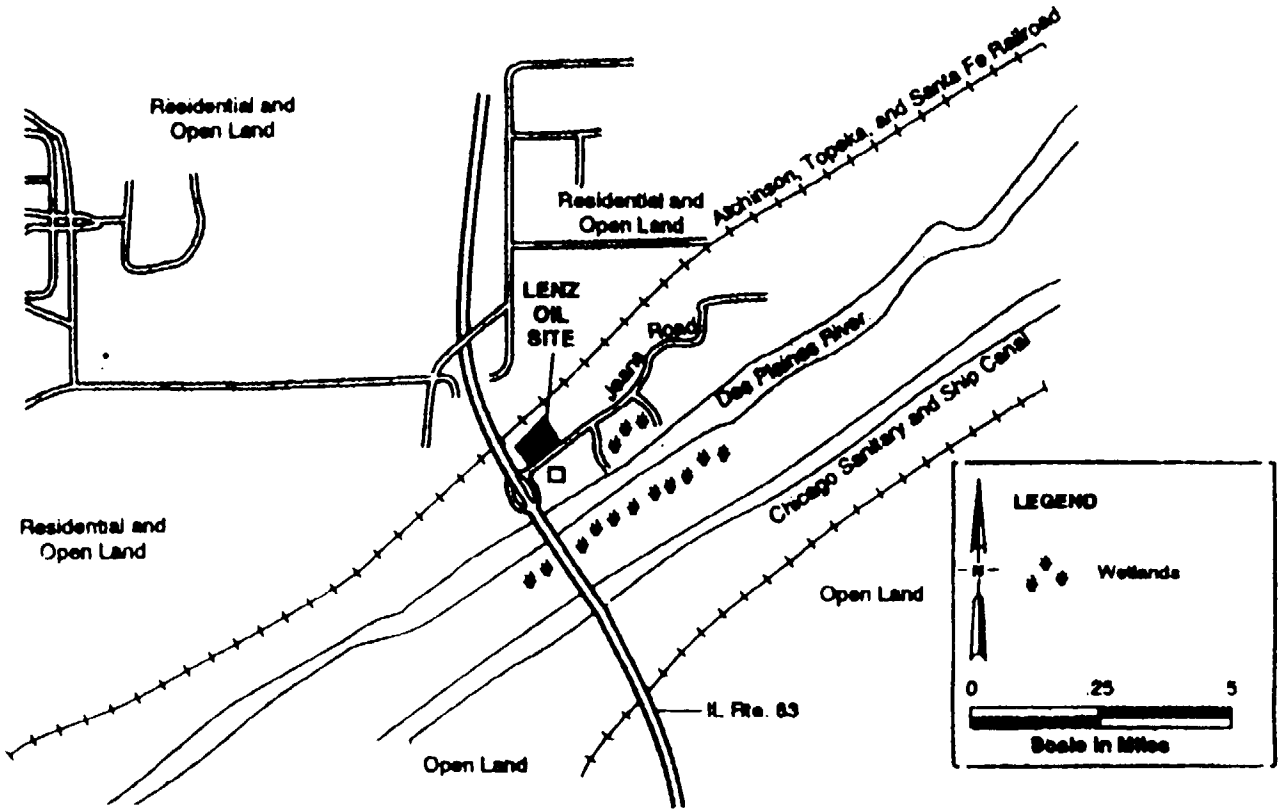
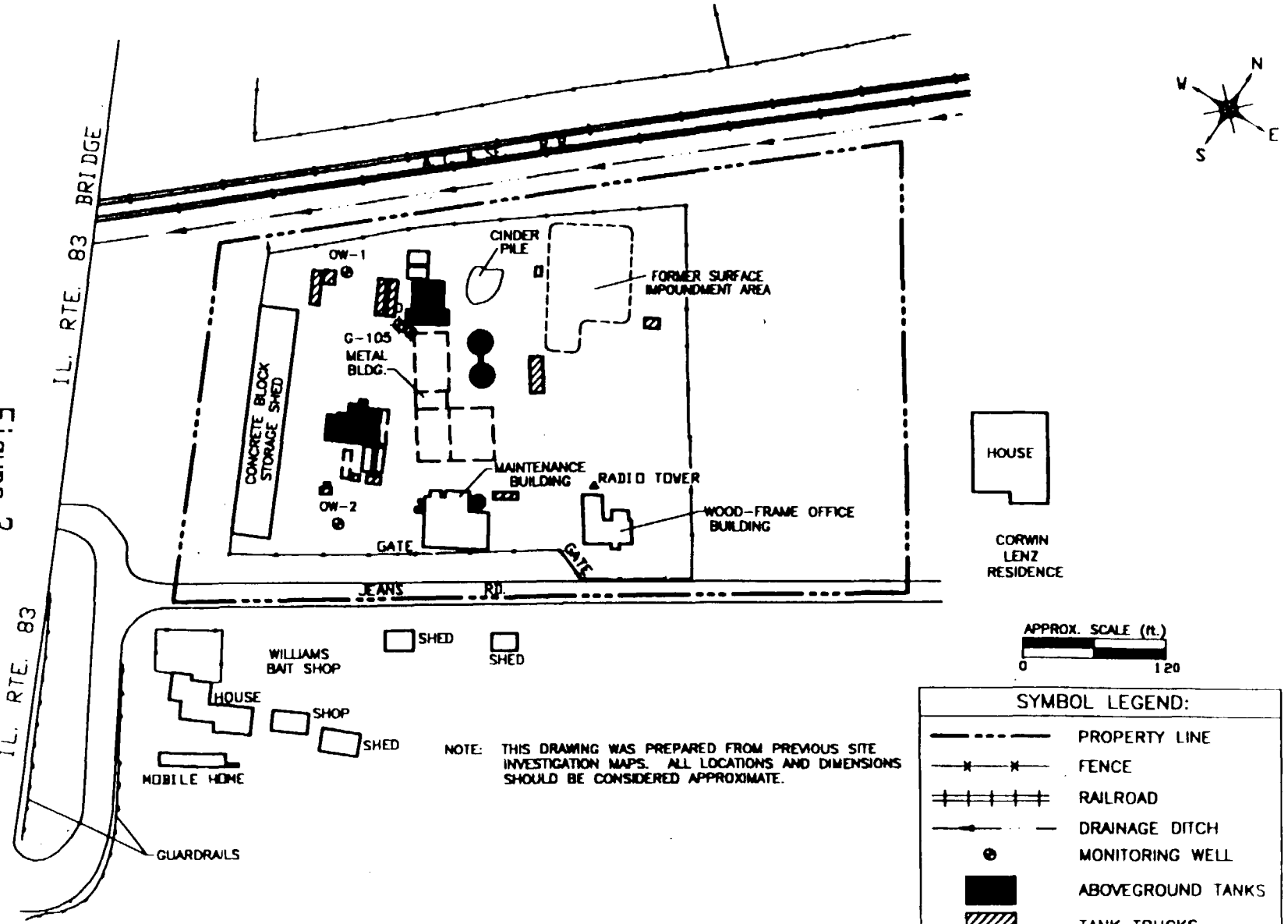


Figure 2

Features of Site Area

Source: Figure 1-3, Feasibility Study Report, ERM-North Central, Inc., February 1997

Figure 3
Former Site Features



NOTE: THIS DRAWING WAS PREPARED FROM PREVIOUS SITE INVESTIGATION MAPS. ALL LOCATIONS AND DIMENSIONS SHOULD BE CONSIDERED APPROXIMATE.

ERM

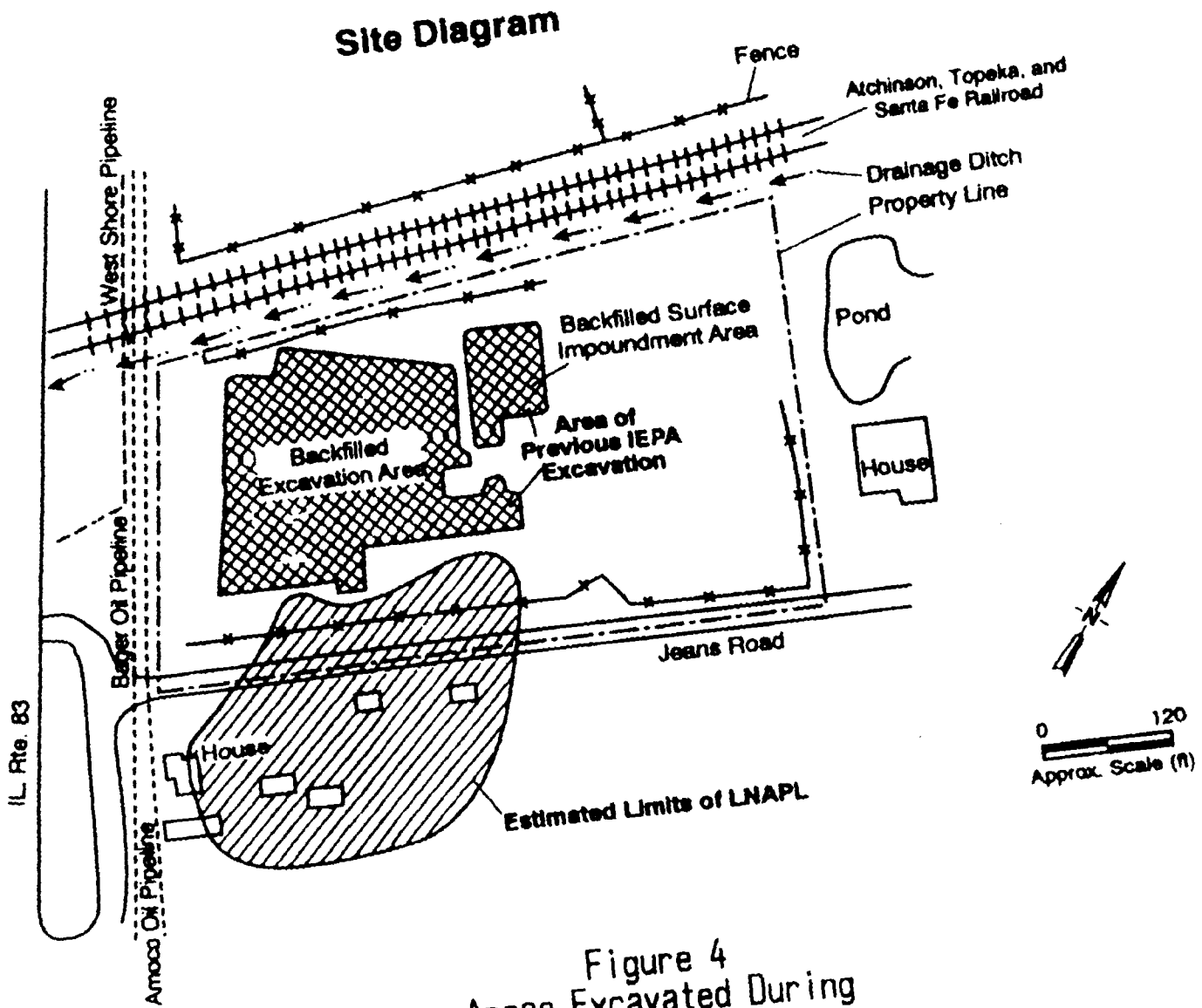


Figure 4
Areas Excavated During
IEPA Removal

Source: Figure 1-7, Feasibility Study Report, ERM-North Central, Inc., February 1997

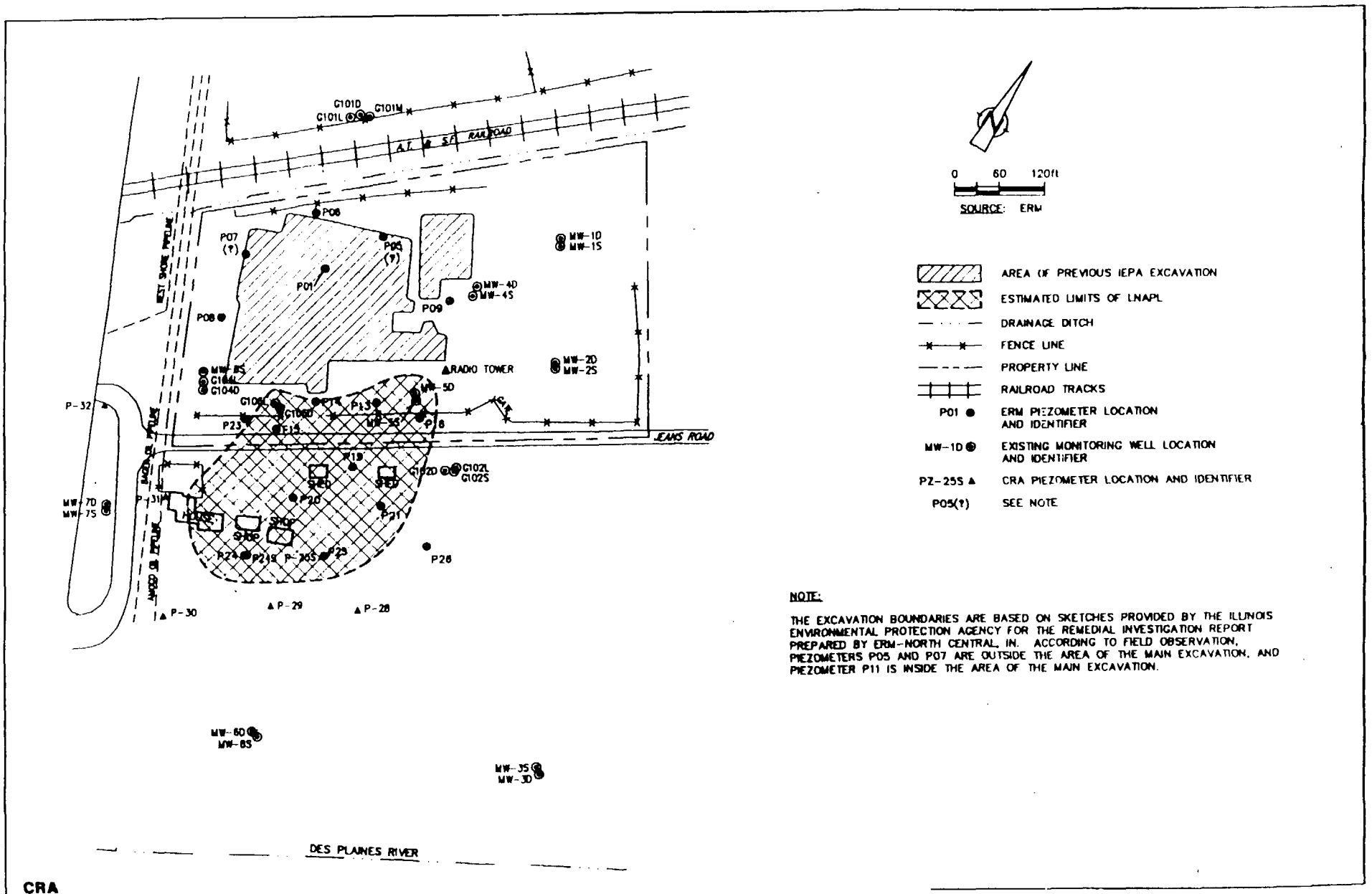
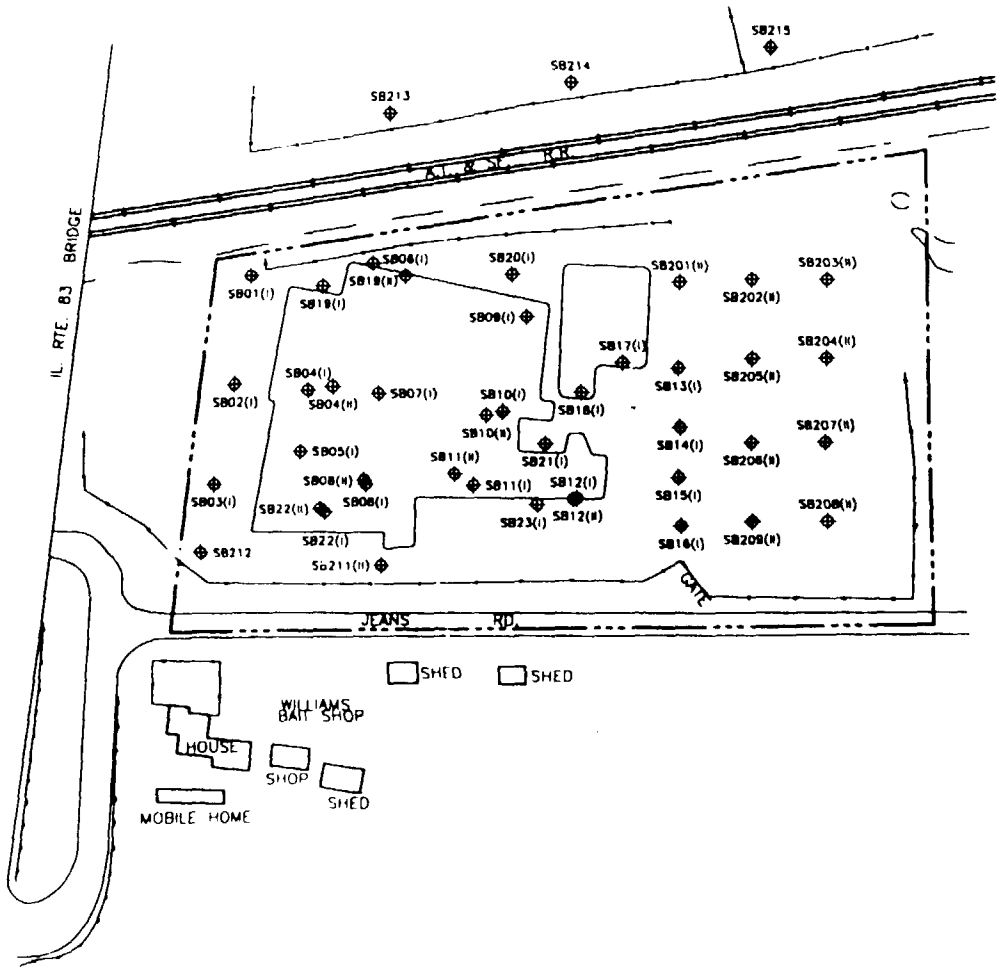


Figure 5

Location of LNAPL Plume

Source: Figure 1.2, Feasibility Study Addendum, Conestoga-Rovers & Associates, October 1998

Figure 6
Shallow Soil Sampling Locations



APPROX SCALE (ft)
0 100

SYMBOL LEGEND

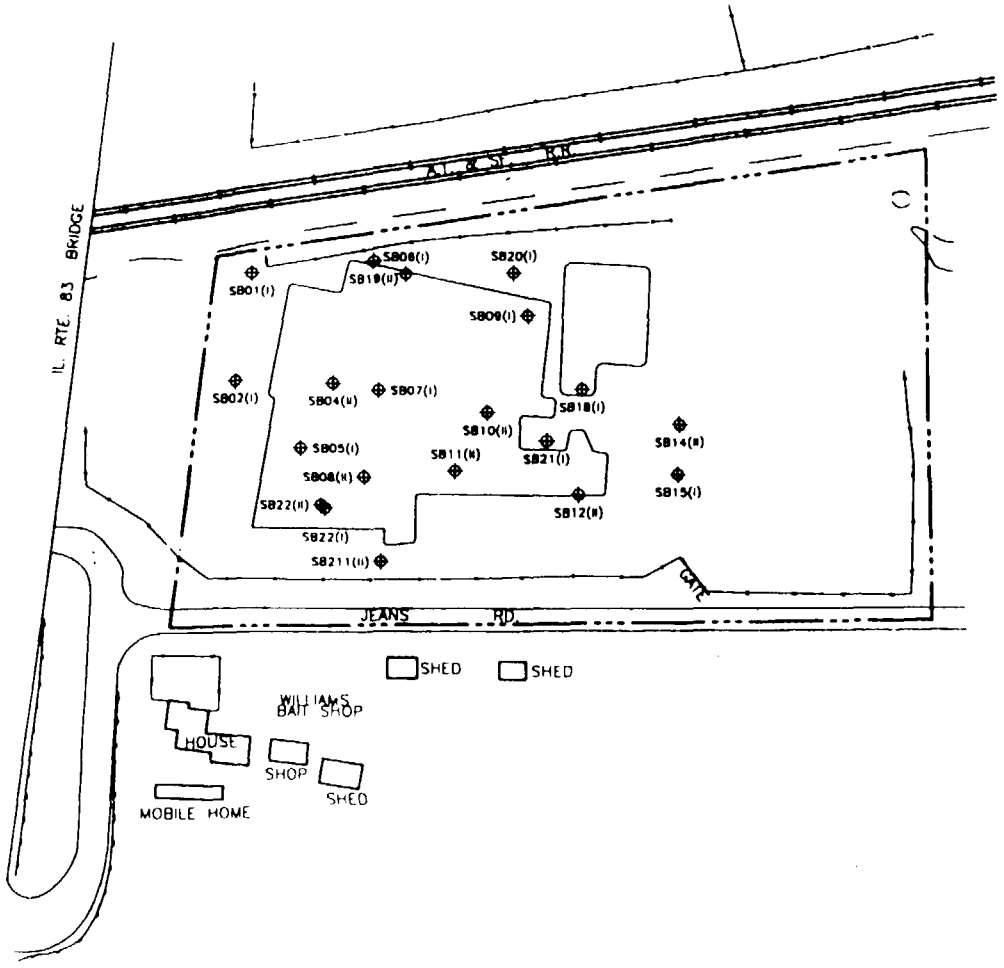
- SOIL BORING WHERE (I) OR (II) INDICATES PHASE I OR II
- DRAINAGE DITCH
- PROPERTY LINE
- FENCE LINE
- RAILROAD

NOTE

1. LOCATIONS ARE BASED ON IEPA FIELD MEASUREMENTS AND HAVE NOT BEEN SURVEYED. THEREFORE, LOCATIONS SHOULD BE CONSIDERED APPROXIMATE

ERM

Figure 7
Deep Soil Sampling Locations



APPROX SCALE (ft)
0 100

SYMBOL LEGEND

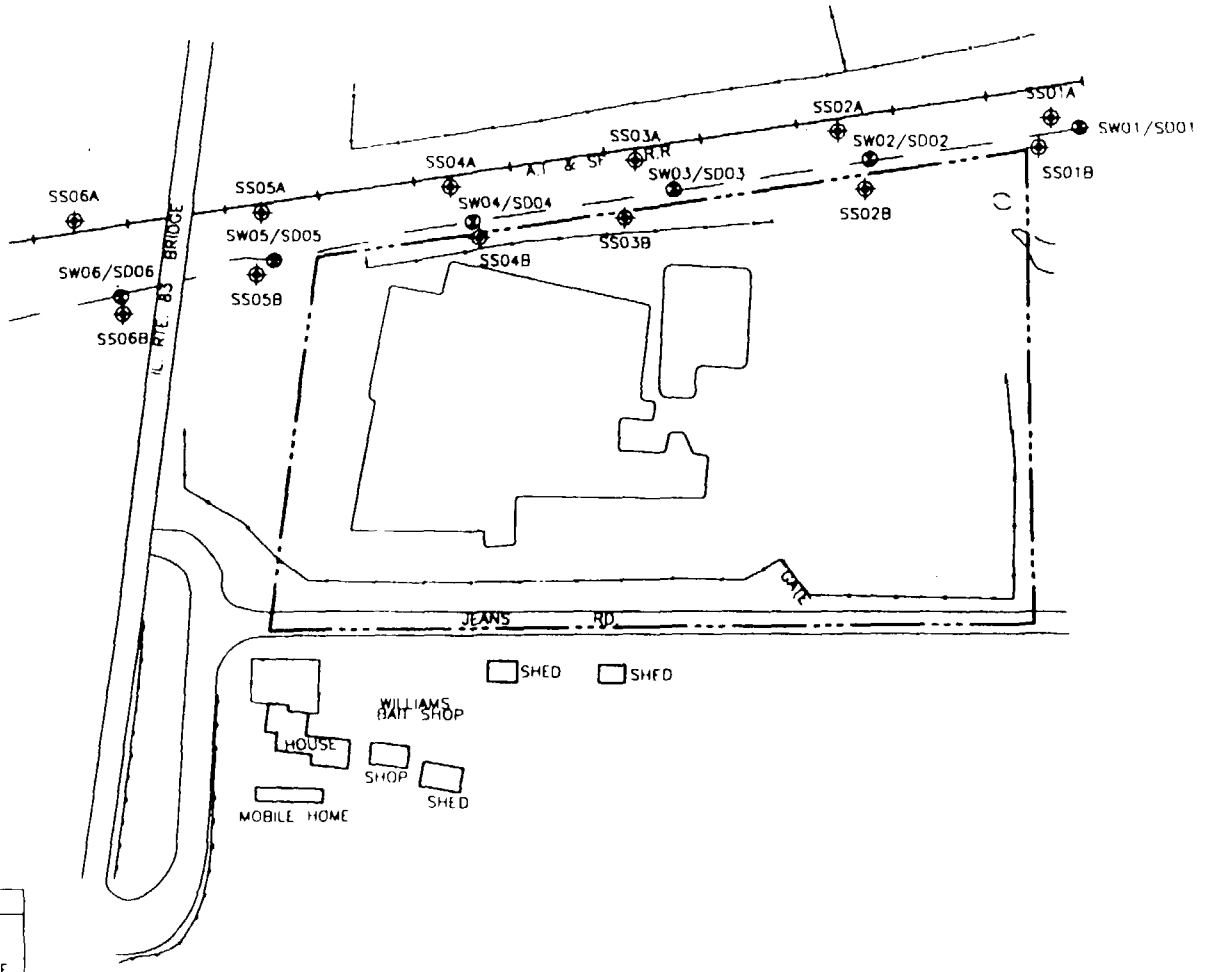
- ⊕ SOIL BORING WHERE (I) OR (II) INDICATES PHASE I OR II
- DRAINAGE DITCH
- PROPERTY LINE
- FENCE LINE
- RAILROAD

NOTE

1 LOCATIONS ARE BASED ON IEPA FIELD MEASUREMENTS AND HAVE NOT BEEN SURVEYED. THEREFORE, LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.

ERM

Figure 8
Surface Water and Sediment Sampling Locations



APPROX SCALE (ft)
0 100

SYMBOL LEGEND

- SURFACE SOIL SAMPLE
- SEDIMENT AND SURFACE WATER SAMPLE
- DRAINAGE DITCH
- PROPERTY LINE
- FENCE LINE
- RAILROAD

NOTE

1 LOCATIONS ARE BASED ON IEPA FIELD MEASUREMENTS AND HAVE NOT BEEN SURVEYED. THEREFORE, LOCATIONS SHOULD BE CONSIDERED APPROXIMATE

ERM

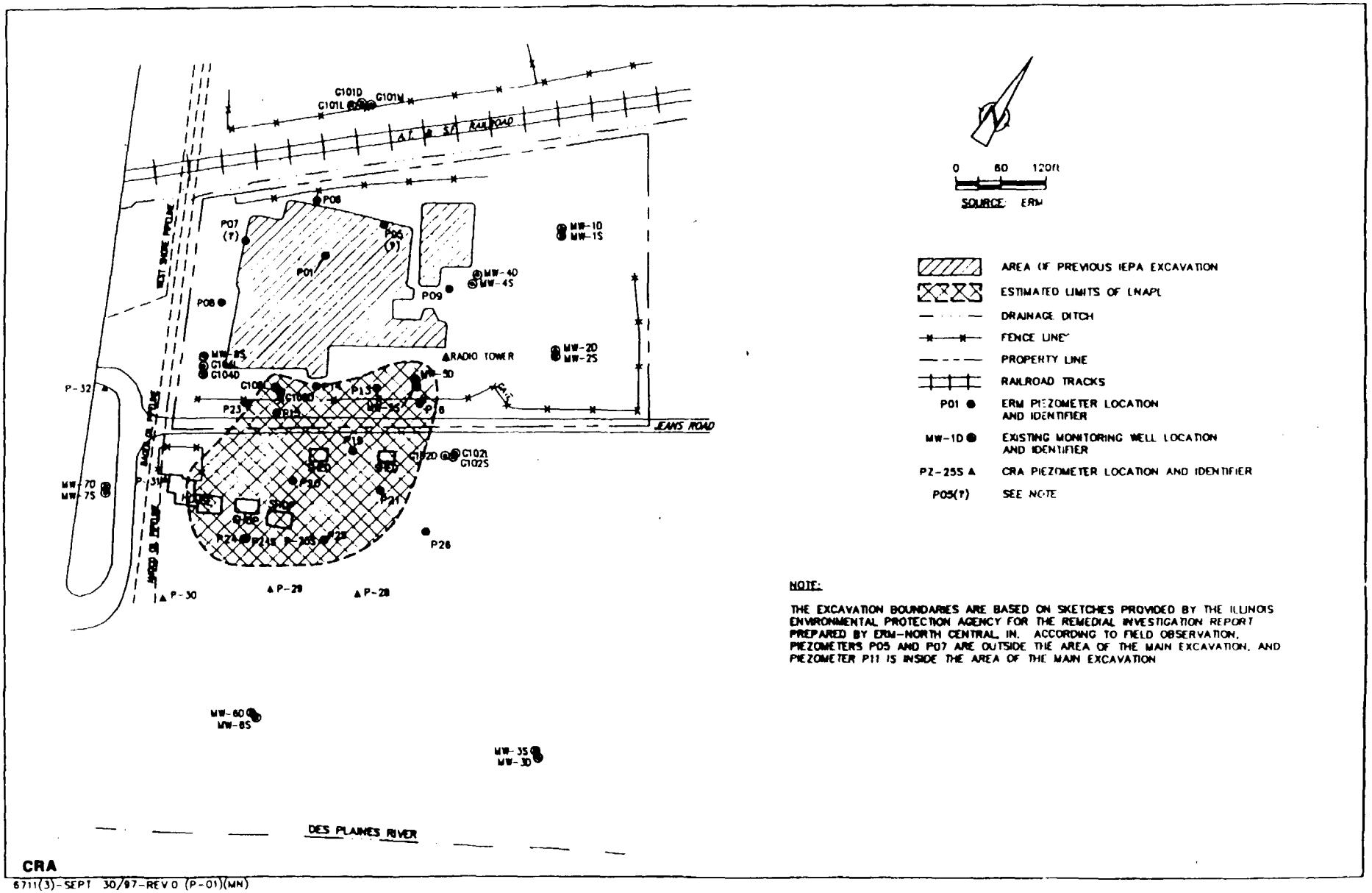


Figure 9
Monitoring Well and Piezometer Locations

Source: Figure 1.2, Feasibility Study Addendum, Conestoga-Rovers & Associates, October 1998

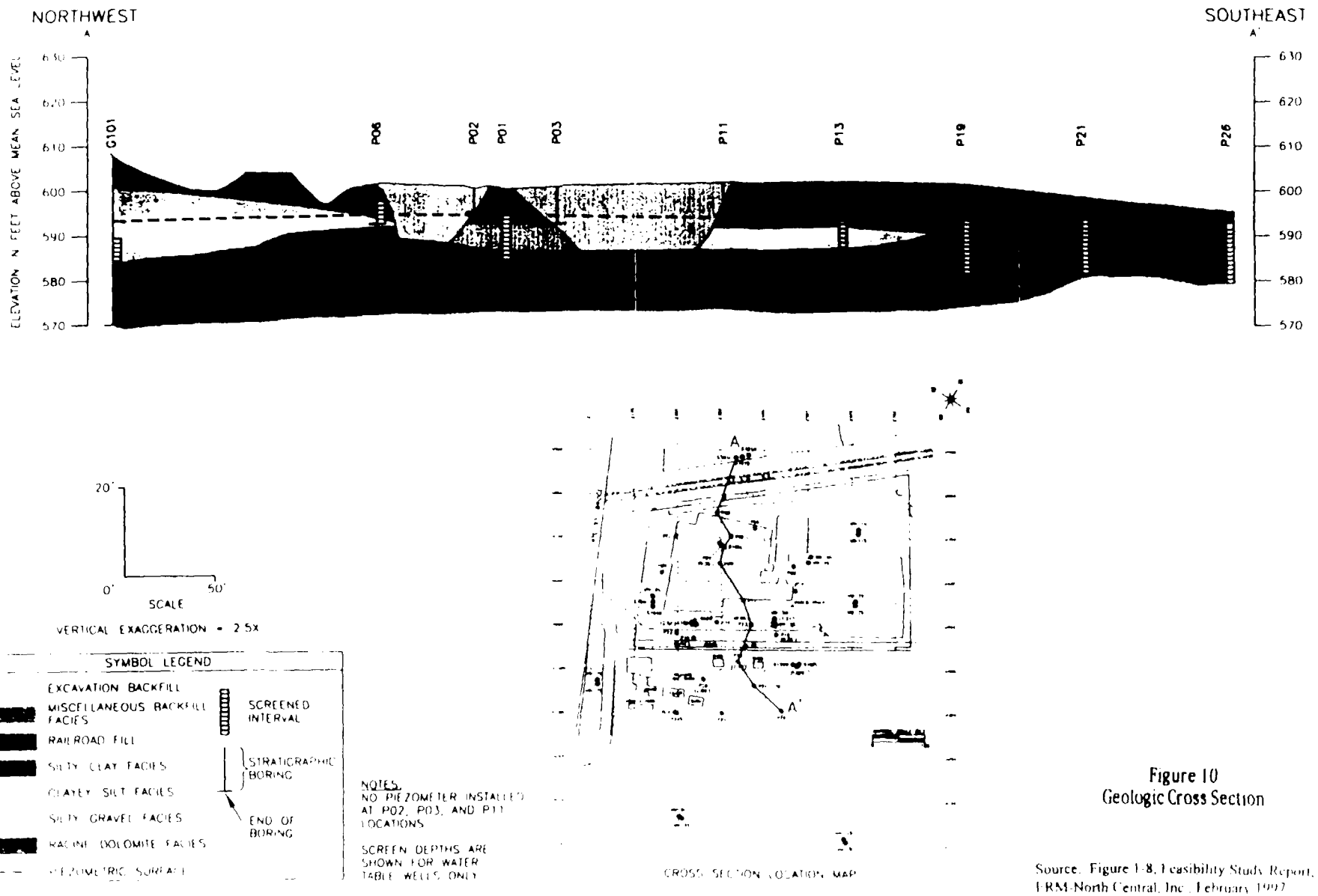


Figure 10
Geologic Cross Section

Source: Figure 1-8, Feasibility Study Report, ERM-North Central, Inc., February 1997

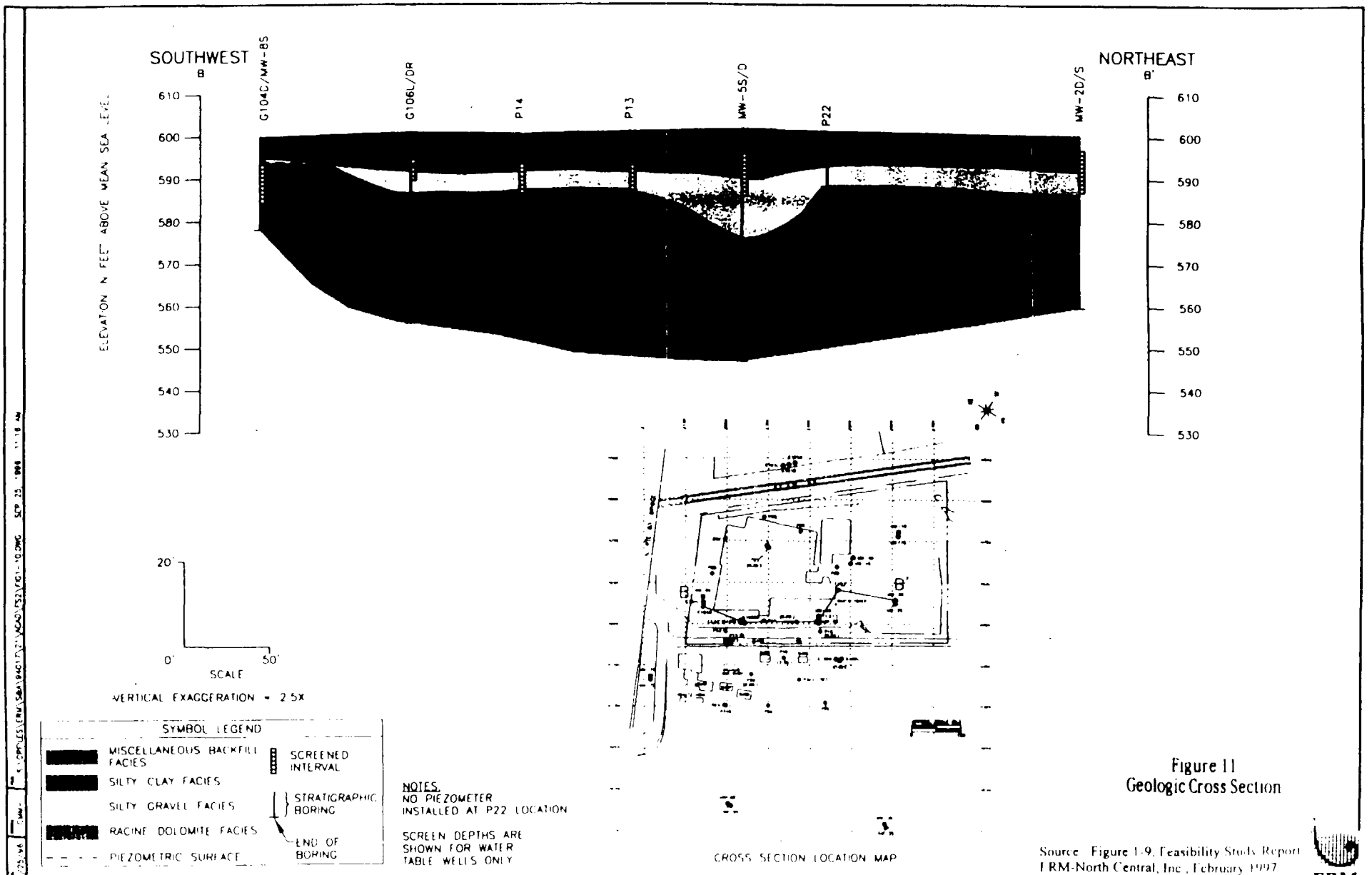
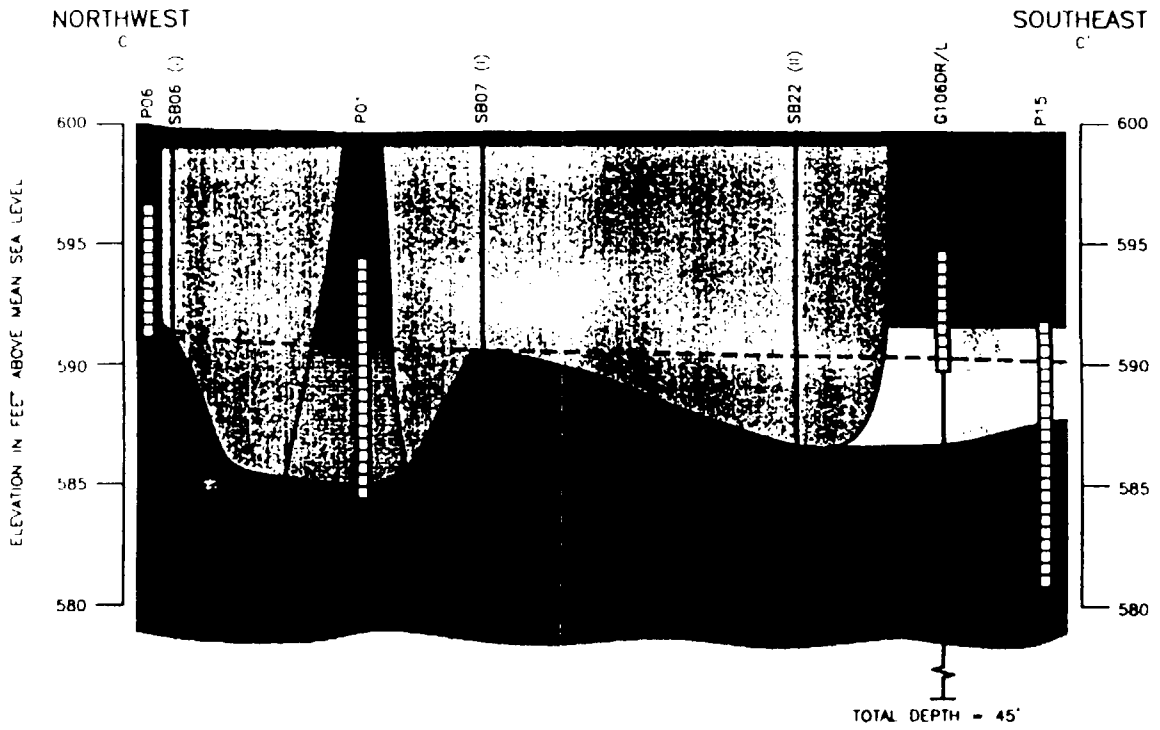
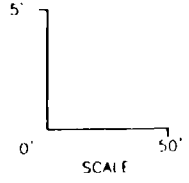


Figure 11
Geologic Cross Section

Source: Figure 1-9, Feasibility Study Report ERM-North Central, Inc., February 1997

ERM

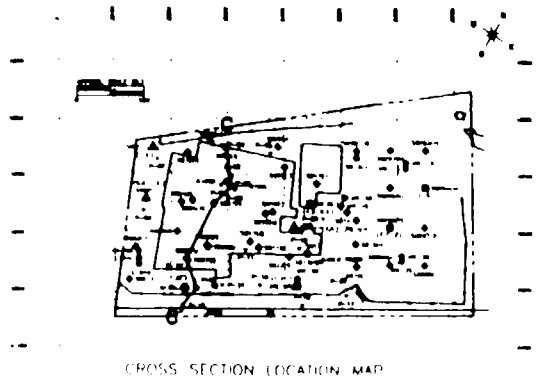




VERTICAL EXAGGERATION = 10X

SYMBOL LEGEND

- TOPSOIL
- EXCAVATION BACKFILL
- ROADBASE
- SILTY CLAY FACIES
- CLAYEY-SILT FACIES
- SILTY GRAVEL FACIES
- RACINE DOLOMITE FACIES
- PIEZOMETRIC SURFACE
- SCREENED INTERVAL
- STRATIGRAPHIC BORING
- END OF BORING



CROSS SECTION LOCATION MAP

DETAILED

Figure 12
Geologic Cross Section

Source: Figure I-10, Feasibility Study Report
ERM-North Central, Inc., February 1992

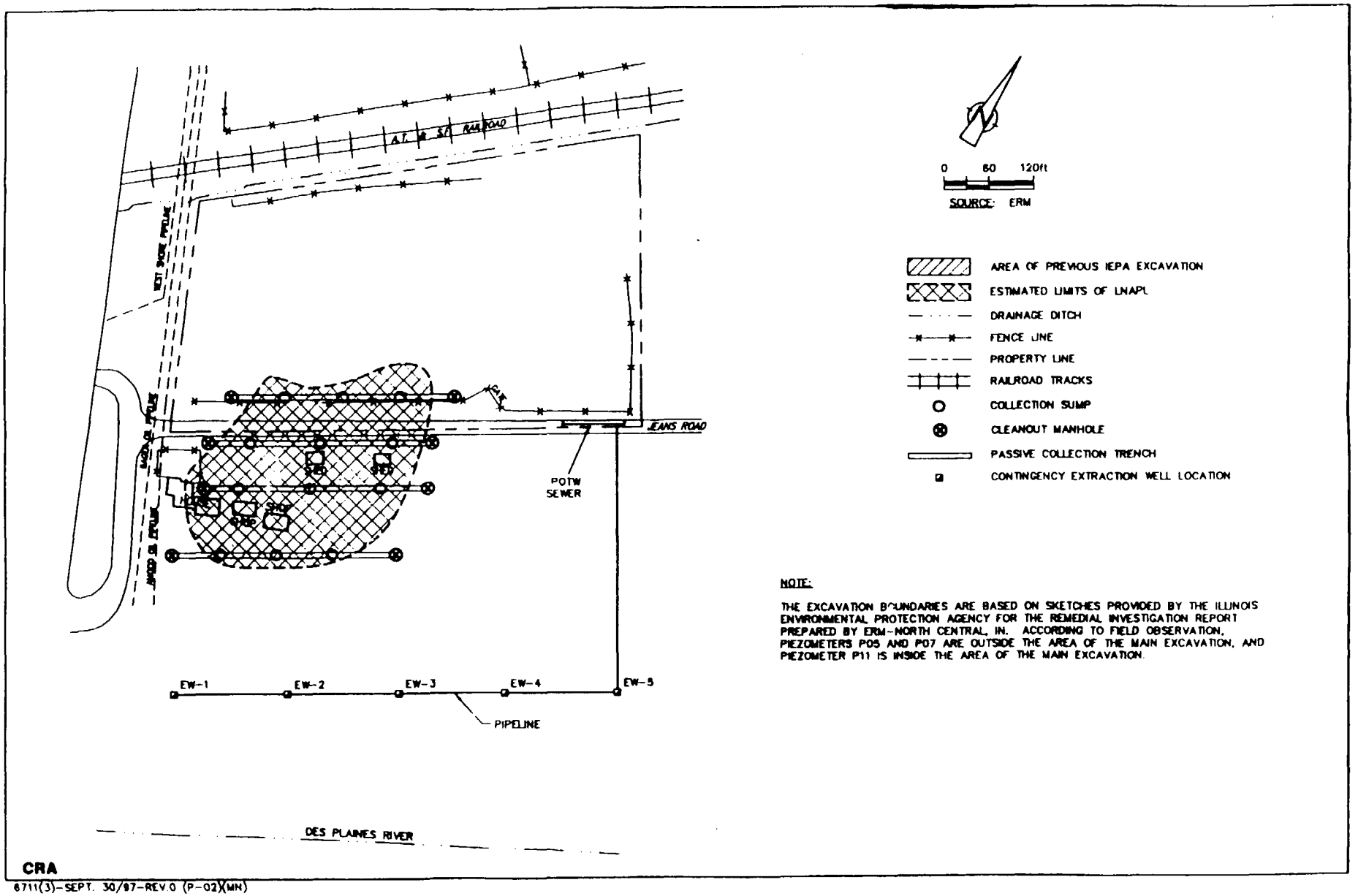


Figure 13
Alternative 2

Source: Figure 3.1, Feasibility Study Addendum, Conestoga-Rovers & Associates, October 1998

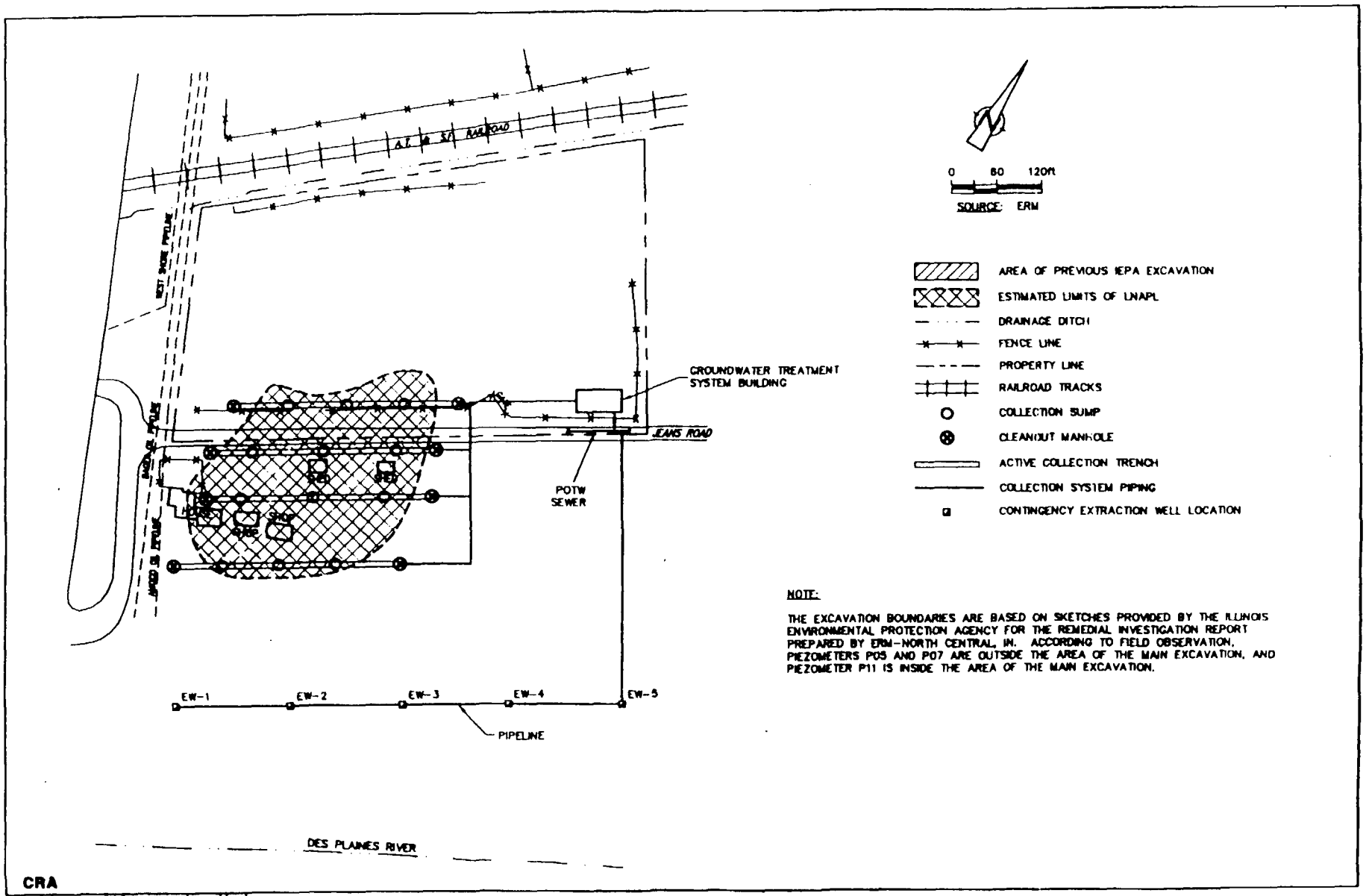


Figure 14
Alternative 5A

Source: Figure 3.3, Feasibility Study Addendum, Conestoga-Rovers & Associates, October 1998

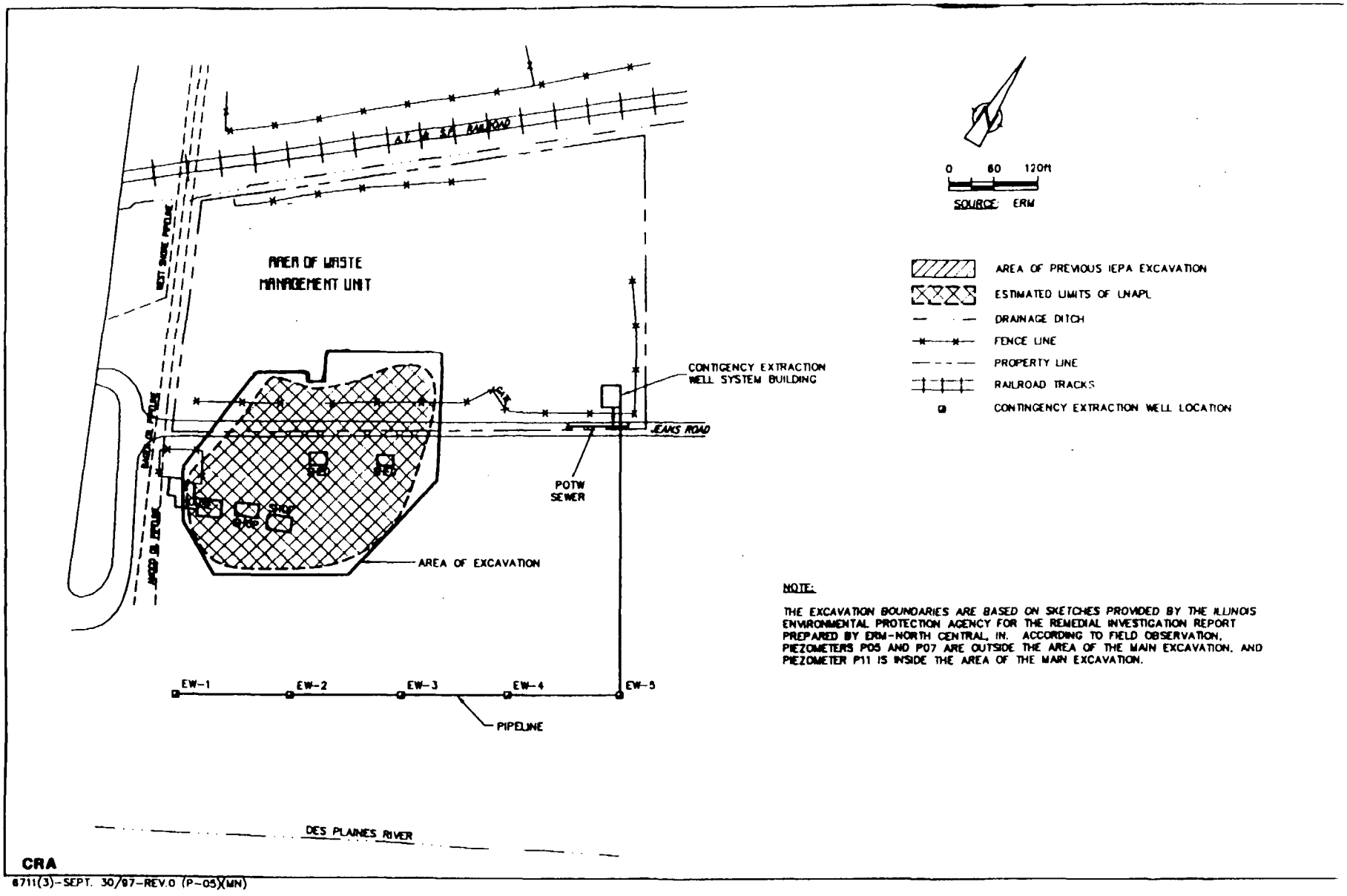


Figure 15
Alternatives 9A and 9B

Source: Figure 3.5, Feasibility Study Addendum, Conestoga-Rovers & Associates, October 1998

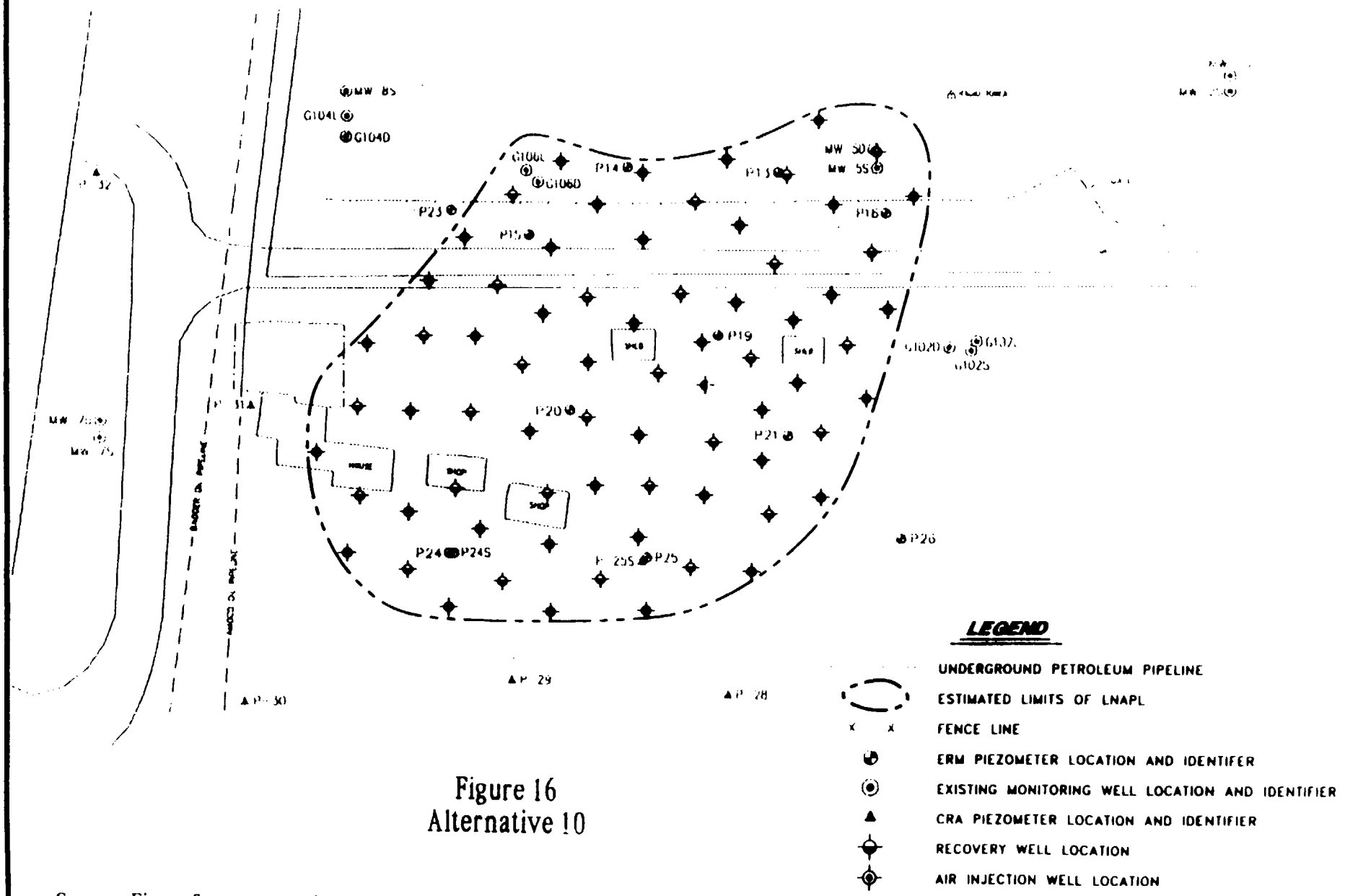


Figure 16
Alternative 10

Source: Figure from presentation by Conestoga-Rovers & Associates to IEPA, November 1997

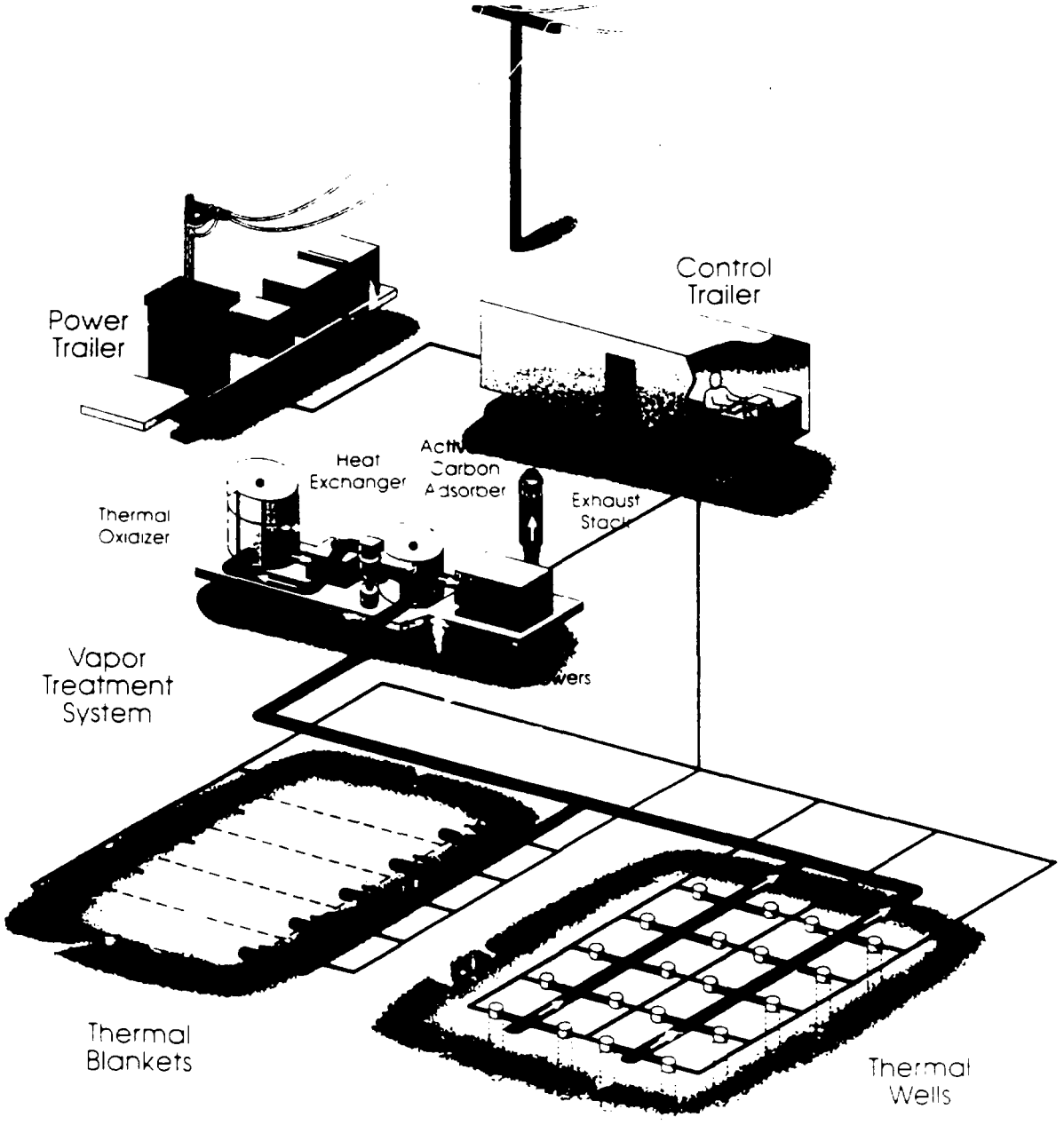


Figure 17
Alternative 11
(Conceptual Diagram)

Assessment

As a point of clarification, metal contamination in and of itself was not a reason for U S EPA's recommendation for Phase I remedial alternative of the Lenz Oil site Regarding the commenters' assertion that tests indicating metal contamination in ground water were "flawed since the test samples were negligently contaminated through improper sampling techniques", U.S. EPA does not understand what the commenter is referring to and with all sincerity does not know of any groundwater samples collected for inorganic analysis that were contaminated due to improper sampling techniques. The commenter may be referring to discussions between U.S. EPA, IEPA and the PRPs that conducted the RI/FS about how to interpret some of the inorganic analytical results for groundwater samples collected from monitoring wells near the Des Plaines River Some of the groundwater samples collected from these wells were not filtered prior to being analyzed. Filtering a groundwater sample removes suspended particulates that may be present, and since heavy metals may adsorb onto particulates, it has been argued that allowing the particulates to remain in the sample to be analyzed, i.e., not filtering the sample, could lead to higher levels of metals in the sampling results. Currently, the most agreed upon approach in the scientific community is to analyze both a filtered and unfiltered sample of ground water to determine the levels of metals in each.

Related to the second part of this comment, the commenter refers to a small pocket of LNAPL that was left in place after the IEPA removal action in 1987 and 1988. This LNAPL area will be removed as part of Phase I. The estimated abilities of the primary Phase I remedy and the two contingent Phase I remedies to address the principal threat at the site, in terms of the amount of the total volume of LNAPL at the site that the technology could potentially remove or treat, are 90% to 99% for Alternative 9A; 50% to 80% for Alternative 10; and 90% to 99% for Alternative 11. These estimated percentages, which will be verified by predesign studies, show that each of the three remedies does remove the principal threat.

U.S. EPA acknowledges that all three remedial alternatives, especially Alternative 9A, would involve a short-term increase in potential risk during site cleanup. All appropriate measures will be taken in order to keep this increased risk at a minimum. Traffic will be rerouted. Nearby residents may be temporarily relocated. On-site workers will wear personal protective equipment

Comment # 12: One group of commenters made a number of statements concerning their understanding of the meaning of a ROD prepared by IEPA for their removal action that took place in 1987 and 1988.

U.S. EPA is not in a position to comment on or respond to the commenters' statements

Comment # 13: Two groups of commenters recommended that U.S. EPA consider Alternative 2 for the Phase I remedial alternative.

Because Alternative 2 would only remove at most 20% of the principal threat at the Lenz Oil site

and technically feasible alternatives are available that could potentially remove up to 99% of the principal threat, U.S. EPA cannot recommend Alternative 2 as the preferred alternative for Phase I cleanup.

Comment #14: One group of commenters made several statements regarding the estimated costs for Alternative 9A. Specifically, the commenters stated that the estimated cost for Alternative 9A (and Alternative 9B) should include $1.3 million in groundwater contingency costs that were added to the costs of the other alternatives.

The contingency cost of $1.3 million was added to those remedies which were not likely to result in removal of over 90% of the LNAPL because U.S. EPA believes that the situations where greater than 10% of the LNAPL remains in the subsurface are those most likely to require additional groundwater work in Phase II cleanup. U.S. EPA did, however, include the $1.3 million in the estimated cost for Alternative 11, which would possibly be able to treat over 90% of the LNAPL *in situ*. It could be argued that, to be consistent, the contingency cost should not be included in the estimated cost for Alternative 11. U.S. EPA added the contingency cost in this case because of the innovative nature of the technology used in Alternative 11 and because the contamination, although it would be treated, would remain in the aquifer.

Comment #15: One group of commenters questioned whether the treated material in Alternatives 9A and 9B should be subject to CAMU regulations if they do not pose an excess carcinogenic risk greater than the 10^{-4} higher limit specified in the NCP.

U.S. EPA recalls the discussions with the commenters and IEPA about how a material need not be considered as a RCRA hazardous waste if, after treatment, the material no longer poses an unacceptable health risk. Because the exact degree of treatment that could be achieved under Alternatives 9A and 9B cannot be ascertained at this time, however, U.S. EPA has included provisions for following CAMU regulations for the treated material.

Comment #16: One group of commenters stated that Alternatives 10 and 11 should be further evaluated before pilot tests are conducted.

U.S. EPA agrees that additional information should be collected about the applicability of Alternatives 10 and 11, as well as Alternative 9A, before expensive treatability studies on the alternatives are initiated.

Comment #17: One group of commenters stated that the basis for the various LNAPL removal efficiencies was unclear.

The basis for the estimated removal efficiencies for each alternative was the feasibility study documents and meetings with the parties conducting the RI/FS. It was clear to all parties involved, however, that these efficiencies were only estimates. That is why one of the objectives of the treatability studies that will be conducted during predesign will be to try to confirm, or

modify if necessary, these numbers

Comment #18: One group of commenters stated that what appeared to be a reliance by U.S. EPA on percent removal of LNAPL as a remedy selection criteria was inappropriate.

All nine criteria specified in the NCP will be used to evaluate the appropriateness of the primary and contingent alternatives. Although Agency guidance states that a principal threat at a site is to be removed if practicable, the intent of the predesign studies planned for the Lenz Oil site is not to just confirm removal efficiencies, but to also gather additional information about the technology, such as its applicability to site-specific conditions, potential implementability problems, amount of air emissions, and cost factors. All of this more accurate and refined information about the alternatives will allow U.S. EPA to better measure each viable alternative against the nine criteria in the NCP.

Comment #19: One group of commenters stated that natural attenuation should be selected as the groundwater remedy.

U.S. EPA believes that by first addressing the principal threat at the site, the evaluation of the use of natural attenuation to achieve groundwater objectives by considering post-Phase I monitoring results will be much more straight-forward. To try to make a case at this point, via modeling or otherwise, that natural attenuation will result in groundwater quality criteria being met would be very difficult, if not impossible, considering all of the unknowns and the minimal amount of groundwater data available.

Comment #20: One group of commenters stated that the designation of a 100-year flood plain for a part of the site is inaccurate.

U.S. EPA acknowledges that the exact location of the 100-year flood plain in the area of the Lenz Oil site needs to be reevaluated during predesign. The flood map relied on for the tentative definition of the 100-year flood plain was developed during the 1970s. Significant alterations of the topography due to a variety of activities, including the late 1980s IEPA removal action and the more recent upgrading of the highway overpass adjacent to the site, have inevitably changed the contours of the 100-year flood plain. These changes will be documented during predesign so that an accurate picture of the flood plain will be understood

Comment #21: One group of commenters objected to references to the LNAPL in the Proposed Plan as being "on and within the shallow aquifer" or "present in the shallow aquifer" because this language appears to suggest that addressing the LNAPL layer constitutes remediation of the aquifer or ground water. The commenters stated that the LNAPL is a separate phase on top of

the ground water and, as such, is not within the aquifer. The commenters briefly stated their understanding of the meaning of agreements entered into by IEPA and the commenters shortly after the IEPA removal action in the late 1980s and indicated that the way in which the Phase I and Phase II cleanups were presented in the Proposed Plan should not be misconstrued as a reinterpretation of these agreements. Because of the possibility that the manner in which the cleanup phases were presented in the Proposed Plan could affect the understanding of the agreements with IEPA, the way in which the Lenz Oil cleanup is presented was inappropriate.

U.S. EPA understands the importance of the agreements between IEPA and a number of PRPs shortly after the IEPA removal action in the late 1980s. U.S. EPA is aware of the differing interpretations of the agreements by the parties involved and the potential for significant future costs associated with the agreements. U.S. EPA believes that no wording and expressions used in the Proposed Plan and ROD, nor the way in which the cleanup is structured in the Proposed Plan and ROD, should lend any credence to or have any bearing on the ultimate resolution of the questions regarding the previously mentioned agreements. U.S. EPA prepared the Proposed Plan and ROD to be consistent with Agency language regarding principal threat and residual groundwater contamination.

U.S. EPA tried to summarize for the record in this Responsiveness Summary the positions and statements the commenters made in their comment letter. A copy of the letter will also be part of the Administrative Record for the site. U.S. EPA acknowledges that the resolution of questions regarding the previously mentioned agreements will take place between the IEPA and the parties who participated in the agreements.

AR

U.S. EPA ADMINISTRATIVE RECORD
REMEDIAL ACTION
LENZ OIL SERVICE SITE
LEMONT, ILLINOIS
UPDATE #1
10/15/96

DOC#	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	07/02/91	Lenz Oil Settling Respondents/ERM-North Central, Inc.	U.S. EPA	Technical Memorandum #3A: Remedial Investigation Phase 1, Task 2 (Volume 1 of 3: Text, Table, Figures and Appendices A F)	332
2	07/02/91	Lenz Oil Settling Respondents/ERM-North Central, Inc.	U.S. EPA	Technical Memorandum #3A: Remedial Investigation Phase 1, Task 2 (Volume 2 of 3: Appendix G)	459
3	07/02/91	Lenz Oil Settling Respondents/ERM-North Central, Inc.	U.S. EPA	Technical Memorandum #3A: Remedial Investigation Phase 1, Task 2 (Volume 3 of 3: Appendix G)	316
4	12/30/91	Lenz Oil Settling Respondents/ERM-North Central, Inc.	U.S. EPA	Remedial Investigation Feasibility Study: Quality Assurance Project Plan Addendum (Revision 1)	611
5	10/00/92	Lenz Oil Settling Respondents/ERM-North Central, Inc.	U.S. EPA	Remedial Investigation Report [Revision 1]: Volume 1 of 6 (Text and Sections 1 3)	189
6	10/00/92	Lenz Oil Settling Respondents/ERM-North Central, Inc.	U.S. EPA	Remedial Investigation Report [Revision 1]: Volume 2 of 6 (Section 4)	233
7	10/00/92	Lenz Oil Settling Respondents/ERM-North Central, Inc.	U.S. EPA	Remedial Investigation Report [Revision 1]: Volume 3 of 6 (Sections 5 7 and Appendix A)	409
8	10/00/92	Lenz Oil Settling Respondents/ERM-North Central, Inc.	U.S. EPA	Remedial Investigation Report [Revision 1]: Volume 4 of 6 (Appendices B I)	353
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117	02/00/98	U.S. EPA/ OSWER	U.S. EPA	Newsletter: *U.S. EPA Tech Trends* (Issue No.28 Highlighting In Situ Remediation Technologies Using Various Forms of Electro-kinetics and Electro-heating (EPA 542-N-98-003)	4
118	03/03/98	Tierney, M., U.S. EPA	Willman, J., IEPA	Cover Letter re: Request for IEPA Review of the *Draft Proposed Plan* for the Lenz Oil Site	2
119	06/17/98	Tierney, M., U.S. EPA	Willman, G., IEPA	Letter re: Request for IEPA Concurrence on the *Proposed Plan* for the Lenz Oil Site	2
120	07/29/98	*Lemont Reporter*	Public	*Public Notice* Announcing U.S. EPA's Proposed Final Cleanup Remedy and August 17, 1998 Public Meeting and July 30-August 28, 1998 Public Comment Period for the LenzOil Site	1
121	07/29/98	Illinois Department of Public Health/ ATSDR	U.S. EPA	*Public Health Assessment* for the Lenz Oil Site	69
122	08/00/98	Concerned Citizens	U.S. EPA	Seven Public Comment Letter Received August 1998 Concerning the Recommended Cleanup Plan for the Lenz Oil Site	8
123	08/24/98	Wright Reporting,	U.S. EPA	*Transcript* of the August 17, 1998 Proposed Plan	54

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
		Inc.		Public Meeting re: the Lenz Oil Site	
124	09/02/98	*Reporter-Progress* (Lemont, IL)	Public	*Public Notice* Announcing the Extension of the Public Comment Period for the Final Cleanup Remedy for the Lenz Oil Site (September 2-4, 1998)	1
125	09/09/98	Kwasneski, R., Village of Lemont & G. Bergmark, Lemont Environmental Advisory Committee	Blum, G., U.S. EPA	Letter re: Village of Lemont's Comments on the *Proposed Cleanup Plan* for the Lenz Oil Site	2
126	09/14/98	U.S. Army Corps of Engineers/ Omaha	U.S. EPA	Tri-Service Cost Engineering System Report for the Lenz Oil Site Thermal Desorption	6
127	09/16/98	Bielawski, A., *Sidley & Austin*	Blum, G., U.S. EPA	Letter re: Participating Companys' Comments on the *Proposed Plan* for the Lenz Oil Site	7
128	09/16/98	Bielawski, A., *Sidley & Austin*	Blum, G., U.S. EPA	Letter re: Participating Companys' Comments on the Description and Characterization of Light, Nonaqueous Phase Liquid (LNAPL) Contamination at the Lenz Oil Site	3
129	09/16/98	Jawor, J.; *The Jawor Law Firm, P.C.*	Blum, G., U.S. EPA	Letter re: RAI, Inc.'s Comments on the *Proposed Plan* for Cleanup at the Lenz Oil Site	7
130	09/21/98	Tierney, M., U.S. EPA	Bielawski, A.; *Sidley & Austin*	Letter re: U.S. EPA's Acceptance of the *Feasibility Study* and Related Submittals for the Lenz Oil Site	

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
131	09/23/98	Willman, G., IEPA	Tierney, M., U.S. EPA	Letter Forwarding Excerpts from *Modification to RCRA Closure Plan and Basis of Design Report* for the Modern Plating Corporation Site	23
132	00/00/00	U.S. EPA	U.S. EPA/ National Remedy Review Board	Memorandum: Response to NRRB Concerning the Lenz Oil Site **(PENDING)**	
133	00/00/00	IEPA	U.S. EPA	Letter re: the Lenz Oil Site **(PENDING)**	
134	00/00/00	U.S. EPA	Public	*Record of Decision* for the Lenz Oil Site **(PENDING)**	

GUIDANCE ADDENDUM

THE FOLLOWING DOCUMENTS HAVE NOT BEEN COPIED
FOR PHYSICAL INCLUSION INTO THE ADMINISTRATIVE RECORD

DOCUMENTS MAY BE VIEWED AT
U.S. EPA REGION 5

Lenz Oil AR
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NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
135	12/00/89	U.S. EPA/ OERR	U.S. EPA	*Risk Assessment Guidance for Superfund: Volume 1, Human Health Evaluation Manual, (Part A)* [Interim Final] (EPA/540/1-89/002)	
136	12/13/89	U.S. EPA/ OERR	U.S. EPA	*Risk Assessment Guidance for Superfund: Volume 1, Development of Risk-Based Preliminary Remediation Goals, (Part B)* (OSWER Directive 9285.7-01B)	
137	12/13/89	U.S. EPA/ OERR	U.S. EPA	*Risk Assessment Guidance for Superfund: Volume 1, Risk Evaluation of Remedial Alternatives, (Part C)* (OSWER Directive 9285.7-01C)	
138	10/00/90	U.S. EPA/ OSWER	U.S. EPA	*Guidance for Data Useability in Risk Assessment* (OSWER Directive 9285.7-05)	
139	03/25/91	U.S. EPA/ OERR	U.S. EPA	*Risk Assessment Guidance for Superfund: Volume 1, Human Health Evaluation Manual Supplemental Guidance, "Standard Default Exposure Factors"* [Interim Final] (OSWER Directive 9285.6-03)	
140	05/00/92	U.S. EPA/ OSWER	U.S. EPA	Intermittent Bulletin (Vol. 1, No. 1): *Supplemental Guidance to RAGS: Calculating the* Concentration Term (OSWER Directive 9285. 7-08)	

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
141	09/00/98	U.S. EPA/ OSWER	U.S. EPA	*OSWER Directive Classification Numbering System* (HIGHLIGHTED DOCUMENTS ARE INCORPORATED BY REFERENCE INTO THE ADMINISTRATIVE RECORD)	61

APPENDIX A

LENZ OIL SITE RESPONSIVENESS SUMMARY

This Responsiveness Summary addresses concerns expressed by the public and potentially responsible parties (PRPs) in written and oral comments received by the United States Environmental Protection Agency (U.S. EPA) regarding the Proposed Plan for a Record of Decision (ROD) for the Lenz Oil Services, Inc., Superfund (Lenz Oil) site, Lemont, DuPage County, Illinois; CERCLIS ID#: ILD 005451711; Site Spill ID#: 05BN.

Community Relations Background

U.S. EPA (the Agency) released the Proposed Plan for the ROD for public review on July 30, 1998. A copy of the Proposed Plan was mailed to over 1400 addresses which included residents in the vicinity of the site and PRPs. The thirty-day public comment period on the Proposed Plan was opened on July 30, 1998, and originally was to close on August 28, 1998. A public meeting was held at the Witkowski Recreation Center, 1115 Warner Avenue, Lemont, Illinois, on August 17, 1998, to explain the Phase I alternatives presented in the Proposed Plan, to answer questions about potential health risks, and to discuss the proposed primary alternative and contingent alternatives for Phase I cleanup. An advertisement was placed in the July 29, 1998, edition of the *Lemont Reporter* to announce the public comment period and meeting. A question and answer period was included in the meeting, along with the formal comment period. During the public meeting, and in a letter sent after the meeting, an extension to the public comment period was requested. U.S. EPA extended the public comment period to September 16, 1998, and placed advertisements announcing the extension in the September 2, 3, and 4, 1998, editions of the *Reporter-Progress*.

Summary of Significant Comments and U.S. EPA Responses

Comment#1: The commenter stated that at the time of the Illinois Environmental Protection Agency (IEPA) removal action in 1987 and 1988, a community oversight committee was formed that included parties from area townships, villages, unincorporated areas, technical experts, and employees from Argonne National Laboratory. The commenter strongly recommended that U.S. EPA talk with community members to see if there is an interest in re-establishing such a committee so that the community could take a more active role in the remedial design/remedial action process.

U.S. EPA supports community involvement throughout the Superfund process. This includes during the sampling and investigation stage, the selection of a remedial alternative, remedial design and site cleanup, and in the follow-up, "operation and maintenance" phase. Once the agreement with the PRPs willing to undertake and fund the cleanup is finalized at the beginning of 2000, U.S. EPA will contact the community member who made the above comment to gather

"leads" about different community members and community groups that might have an interest in being updated and involved throughout the design and cleanup process for the Lenz Oil site. Any community member or group may at any time express their interest in becoming involved by contacting Gordie Blum, U.S. EPA, Office of Public Affairs, Mail code P-19J, 77 West Jackson Blvd., Chicago, Illinois, 60604.

[**Note**: The remainder of the comments were submitted as written comments.]

Comment #2: Several commenters stated that Alternative 11, one of the contingent remedial alternatives, should be implemented instead of Alternative 9A, the primary remedy, because it seems to achieve the same objective and costs less.

Under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), which is the document that prescribes the requirements for the Superfund process, U.S. EPA is required to provide to the public its basis for recommending a certain cleanup approach for a Superfund site. Typically, a ROD describes a single selected remedy for addressing a site. The Lenz Oil ROD is unusual in that it proposes one "primary" remedy (Alternative 9A) for Phase I cleanup, as well as two "contingent" alternatives (Alternatives 10 and 11). The Agency structured the ROD in this way so that two approaches that sounded promising, but for which there was not a great deal of information regarding whether they would work at the Lenz Oil site, could be tested before the cleanup was initiated.

Containing cleanup costs is important to U.S. EPA. In fact, cost is one of the nine criteria specified in the NCP that U.S. EPA must consider when selecting a remedial alternative. The reason that U.S. EPA could not designate Alternative 10 or Alternative 11 as the recommended remedy was that there was not enough information about how either alternative would perform under the specific conditions at the Lenz Oil site. For example, for Alternative 10, one question that needs to be answered is the actual percent of LNAPL that the approach will be able to remove from the subsurface. A question that needs to be answered related to Alternative 11 is whether the claim of 90 to 99% treatment efficiency is valid for the specific conditions at the Lenz Oil site. Both alternatives will be studied during predesign to answer these and other questions. If one or both provide the same general level of protection of human health and the environment at a lower cost, or provide some other significant benefit, as Alternative 9A, U.S. EPA will issue a document (either a ROD Amendment or an Explanation of Significant Differences (ESD)) to select the most effective and cost-effective alternative.

U.S. EPA would also like to point out that the cost estimate of $7.3 million provided in the Proposed Plan for Alternative 11 was incorrect. The corrected cost estimate is $9.9 million. This corrected cost estimate is still less expensive than the estimated cost for Alternative 9A ($12.5 million) and is similar to the estimated cost for Alternative 10 ($9.3 million). If the treatment method used in Alternative 11 is extremely efficient, and, as a result, the $1.3 million contingency for Phase II cleanup is not needed, then the correct estimated cost for Alternative 11 would be $8.3 million.

Comment #3: One commenter stated that considering that the oil floating on the water table beneath the Lenz Oil site has been there for many years, it would seem that U.S. EPA would want to take action as quickly as is practical, and, consequently, that an alternative's short-term effectiveness would be a very important factor in the remedy selection for the Lenz Oil site. Alternative 11 seems not only to provide one of the best short-term effectiveness of all the Phase I alternatives, but it also seems to entail the least disruption to the area's environment and costs less than the other two alternatives being considered.

As stated in the response to the last comment, a correction to the estimated cost for Alternative 11 has been made. Even with the correction, the Alternative 11 cost is still less than that of the primary alternative, Alternative 9A, and is approximately the same as the cost for Alternative 10. U.S. EPA agrees with the commenter that the short-term effectiveness of Alternative 11, the minimal disturbance it would create, and the relatively low cost (even after the correction) make it a very attractive approach. The reason why U.S. EPA did not designate Alternative 11 as the primary recommended alternative was simply because very little research about the applicability of the approach to the conditions at the Lenz Oil site had been done. U.S. EPA will, however, be taking a look at the technology during the predesign phase, that is, before a remedy is designed and cleanup is initiated, to see if Alternative 11 would work at Lenz Oil. One concern that the Agency needs to investigate during predesign is whether the approach outlined in Alternative 11 would work given the very high water table at the Lenz Oil site. The technology, called *in situ* low temperature thermal desorption (*in situ* LTTD), was developed very recently, and optimal conditions for the technology include dry soil. The water table at the Lenz Oil site can at times be as high as four feet below the ground surface. Contamination that will have to be treated may extend from four feet below ground to 14 feet below ground. Since it is possible that the strata to be treated will be saturated, the effect this will have on the effectiveness and cost, and the difficulties this condition may present, will need to be is explored during predesign.

Comment #4: One commenter asked of Alternative 9A, which involves excavation of the contaminated material and treatment of the material using solidification/stabilization (S/S), will this type of treatment remain stable over the long run?

In addition to conducting predesign studies on the contingent alternatives, predesign studies on the treatment method used in Alternative 9A, S/S, will also be done. The objective of the predesign study of S/S will be to determine an appropriate stabilization agent or mixture for the type of contaminated material at the Lenz Oil site. In running these studies, the stabilized material will be subjected to a number of tests so that U.S. EPA can gather information about the short- and long-term stability of the treated material. In addition, the requirements for the area in which the stabilized material will be disposed, referred to as a "CAMU" (corrective action management unit) in the ROD, will depend on the stability test results. A CAMU unit will consist of an impermeable bottom liner covered by a multi-layer cap to seal off the treated contents from the environment. Different types of monitoring of the waste management unit or CAMU disposal area would also be required.

If a suitable stabilizing agent or mixture cannot be found that would provide protection of human health and the environment, even if the stabilized material were then disposed of in a unit similar to a hazardous waste landfill, then a different Phase I remedial approach would be selected

Comment #5: One commenter noted that given the amount of vegetation on the site, the wildlife in the area, and the fact that the elderly resident living right next to the site for years is in good health, it seems that "Mother Nature" has done much to address the pollution at the site and has reclaimed the land. There does not appear to be any danger to anyone at this time or in the future.

Research done in recent years has shown that "Mother Nature" and natural processes can achieve quite a bit in terms of breaking down toxic substances, immobilizing them via adherence to soil particles, and diluting their concentrations. At the Lenz Oil site, the oil floating on the water table beneath the site is several feet below the ground, so signs of its toxic effects are not easily seen The oil contains high levels of toxic heavy metals, high levels of carcinogenic polynuclear-aromatic hydrocarbons (PAHs), high levels of carcinogenic chlorinated organic compounds, and high levels of polychlorinated biphenyls (PCBs). Based on what U.S. EPA toxicologists know about these compounds and on the evaluation of the potential risk to human health and the environment posed by the Lenz Oil site, U.S. EPA believes that taking an action to remove this contaminated oil, which is considered a principal threat, from the subsurface is critical Furthermore, left in place, it is possible that the contaminated oil would eventually migrate further and enter the Des Plaines River. Phase I and II cleanup of the Lenz Oil site will prevent this from happening and will address the potential risks posed by the site.

Comment #6: The variety of opinions about what is and is not harmful expressed by different experts across the nation, and the changes that are made to official levels considered "safe" makes one commenter wonder what opinion or standard, if any, are right. The commenter asks why U.S. EPA would ask the public their opinion about the remedy even though they may not be experts.

U.S. EPA agrees that the amount of conflicting information and expert opinions about what is harmful can be very overwhelming The conclusions that U.S. EPA, university research groups, or medical establishments reach are based on the best information known by the particular group at that time Even given the same set of results from a variety of studies, it is likely that different groups would offer at least slightly different interpretations of the data U.S. EPA's National Center for Environmental Assessment Office, located in Cincinnati, Ohio, is staffed by toxicologists and public health assessors who devote their time to reviewing and trying to objectively extract information from the multitude of environmental contaminant studies done by groups in both the public and private sector. Establishing health-based standards requires a rigorous and painstaking review of the basis for the determir ation by Agency personnel and by outside reviewers. U.S. EPA made its recommendations for Phase I cleanup of the Lenz Oil site based on the best information available to the Agency at this time.

Regarding the question about why U.S. EPA asks for feedback from the public, whenever U.S. EPA makes a decision regarding a cleanup at a Superfund site, the decision must be justifiable from an objective and scientific perspective, it must take into account cost, and it must also take into account the cleanup's impact on the public. Examples of some issues that immediately come to mind when the Agency assesses impact of a cleanup on the public is the amount of disruption it will cause, the amount of truck traffic that it will involve, the possibility for odors that the cleanup could generate, and increased risk that the cleanup could temporarily involve. Although we try to think of all the potential impacts of a cleanup on the public, there are bound to be many comments and opinions from community members and other interested parties that we would not necessarily think of. The cleanup will happen in the middle of a community, and the community will have to "live with" the cleanup that is implemented. For these reasons, the response by the community to U.S. EPA's recommendation is vital and of great importance in making a balanced decision about site cleanup.

Comment #7: One commenter asked about whether deeper parts of the aquifer would be addressed. Phase I cleanup seems to contain options for cleaning up the shallow portion of the aquifer only.

After the majority of the LNAPL, and DNAPL if necessary, is removed in Phase I cleanup, comprehensive groundwater monitoring will be done for at least one year. This may involve installing additional monitoring wells to better delineate the horizontal and vertical, i.e., depth, of the plume. Based on results from monitoring wells installed to date at the site, most of the dissolved-phase contamination is in the aquifer within the first 50 feet below ground level. Phase I cleanup will remove the contaminated LNAPL floating on the top of the aquifer, which is considered the "principal threat" at the site. By removing the highly-contaminated LNAPL, which is fairly close to the ground surface, it is hoped that the quality of the ground water will improve or will at least not degrade further. Monitoring after Phase I cleanup will evaluate the quality of the ground water after the LNAPL is removed. If the monitoring data show that contamination in the ground water still exists at levels that exceed federal and state standards, U.S. EPA will proceed with Phase II cleanup. The approach for Phase II will address all contamination in ground water, whether it be deep or shallow, which exceeds acceptable levels of risks to human health or the environment.

Comment #8: Commenter expressed a concern about potential for toxic air emissions during Phase I cleanup, especially related to Alternative 9A, which would involve excavation.

Whenever implementing a cleanup at a Superfund site, U.S. EPA takes into consideration the potential for the emission of toxic compounds into the air. For cleanups where air emissions are possible, frequent air monitoring and/or sampling is conducted, residents are temporarily relocated, engineering measures are taken to minimize emissions, on-site workers must use sealed air supplies, or, more typically, a combination of several or all of these measures are implemented. The amount of emissions to the air due to excavation activities in Alternative 9A has been estimated, and, based on the estimations, provisions have been made to temporarily relocate

residents near the site that could be affected and to take all precautionary measures. Air monitoring and sampling will be done during Phase I cleanup at the Lenz Oil site.

Comment #9: A commenter requested that a public hearing be conducted prior to making a final decision regarding Phase I and Phase II cleanup.

U.S. EPA intends to schedule meetings with the public to describe the recommended Phase I and Phase II remedies. Because the Phase II remedy will be documented in either a ROD Amendment or Explanation of Significant Differences (ESD), a public hearing to receive comments about the recommendation will occur. For the Phase I remedy, U.S. EPA will schedule a meeting with the public and will at a minimum accept and address comments from the public on an informal basis A formal public hearing will be held for the Phase I cleanup proposal if it is documented in a ROD Amendment instead of an ESD.

Comment #10: One commenter felt that further delineation of the location and extent of both the LNAPL plume and the dissolved-phase groundwater plume should be done before proceeding with either Phase I or Phase II cleanup.

Confirmation of the extent of the LNAPL plume may be done during predesign for Phase I cleanup. Prior to Phase II cleanup, additional monitoring wells will be installed to provide better definition of the extent of the dissolved-phase and LNAPL plume. If, during the course of installation of monitoring wells prior to Phase II, additional LNAPL is discovered that was not addressed in Phase I cleanup, the additional LNAPL will have to be cleaned up. For Phase II cleanup, all ground water that does not meet cleanup criteria will need to be addressed.

Comment #11: One group of commenters stated that Alternative 9A does not materially reduce health risks. The group further stated that the recommended plan for Phase I cleanup not only fails to remove, but exacerbates, the principal threat.

U.S. EPA believes that Alternative 9A, and potentially Alternative 10 or 11, will reduce the potential risks to human health and the environment due to the site. Phase I cleanup is required at the site to address the highly-contaminated LNAPL at the site which is considered a principal threat. Under Alternative 2, between 80% and 90% of the principal threat would remain in the subsurface of the site. Therefore, this is not an acceptable alternative. Contrary to a statement made by the commenter, it is true that contaminants in the LNAPL have led to a dissolved-phase plume of contaminated groundwater. Ground water sampling performed during the remedial investigation/feasibility study (RI/FS) for the site did not conclusively define the vertical or horizontal extent of the dissolved-phase groundwater plume. The LNAPL has moved off the site by being carried along with ground water, so it is mobile. However, for the actual oil to reach the Des Plaines River, if it continues to travel at the rate determined in the RI/FS, it would take a number of decades. Whether or not contaminants in the dissolved-phase groundwater plume are negatively impacting the river will have to be further defined by installing more monitoring wells and collecting more groundwater samples and, possibly, by preparing an Ecological Risk

ATTACHMENT B

STATEMENT OF WORK FOR THE REMEDIAL DESIGN AND REMEDIAL ACTION WORK PLAN AT LENZ OIL SITE LEMONT, ILLINOIS

I. PURPOSE

The purpose of this Statement of Work (SOW) for the Lenz Oil Site (Site) is to implement the Record of Decision (ROD) for the Site which was signed by the Regional Administrator of the United States Environmental Protection Agency (U.S. EPA) Region V on September 30, 1999. Settling Work Defendants will follow the Consent Decree (CD) to which this SOW is appended, U.S. EPA Superfund Remedial Design and Remedial Action (RD/RA) Guidance, the ROD, the Pre-Design Data Collection (PDDC) Work Plan, the RD Work Plan(s), the Remedial Design(s), the RA Work Plan(s), any relevant additional U.S. EPA guidance and this SOW in designing, constructing, implementing, and operating the remedial action and in submitting deliverables for the remedial action at the Site.

II. DESCRIPTION OF THE REMEDIAL ACTION/PERFORMANCE STANDARDS

The Settling Work Defendants will design and implement the remedial action to meet the performance standards and specifications set forth in the ROD and this SOW. The performance standards that the Settling Work Defendants will meet include cleanup standards, standards of control, quality criteria and other substantive requirements, criteria or limitations including all Applicable or Relevant and Appropriate Requirements (ARARs) set forth in the ROD, SOW and/or Consent Decree.

For Phase I, the ROD recommends one alternative as the primary alternative for the remedy and recommends that additional remedial alternatives be studied during the PDDC to determine if either of the two alternatives would provide a similar level of protection to human health and the environment as the primary alternative. To assess the effect that Phase I cleanup will have on groundwater, Settling Work Defendants shall conduct at least one year of groundwater monitoring before implementing Phase II.

U.S. EPA's intent in designating a Phase II cleanup of the Site is to allow for further action to be taken at the Site if, after Phase I cleanup is complete, contaminants in area groundwater continue to be present at levels that exceed ARARs.

A. Site Security and Fence Installation

The Settling Work Defendants will install and maintain a fence around the Site property boundary in order to prevent access to the Site and to prevent vandalism to the Site remedy components. Settling Work Defendants will exercise best efforts to obtain all access and required easements for the purposes of installing and maintaining fencing around the Site.

The fence will consist of a minimum six-foot high galvanized steel chain-link fence with a minimum three-strand barbed wire. The length and construction of the fence will completely enclose the perimeter and prevent access to the Site. The Settling Work Defendants will prepare and utilize a Surveying Report to establish the Site perimeter and fence lines properly if such information does not currently exist and exact placement of the fence will be approved by U.S. EPA. The fence will be equipped with a locking swing gate(s). During construction, temporary fencing may be used in lieu of a permanent fence. The permanent fence will not interfere with roadways.

Settling Work Defendants will post reflective warning signs at 200-foot intervals along the fence and on the gate(s). The warning signs will advise that the area is hazardous due to chemicals in soils and groundwater which pose a risk to public health if exposed to through direct contact. The signs shall provide a local telephone number to call for further information. Settling Work Defendants will install the fence and the warning signs within 60 calendar days of the approval of the PDDC Work Plan.

Settling Work Defendants will inspect the entire fence (including warning signs) at a minimum of once every month during construction and then following construction, at a frequency stated in the U.S. EPA approved O & M Plan. Incidents of vandalism, trespassing, and breaches of the fence will be recorded by Settling Work Defendants and reported and documented to local authorities and U.S. EPA as soon as possible after such incidents are reported to or discovered by Settling Work Defendants. Settling Work Defendants will repair any damage or deterioration to the fence, or perform any other maintenance within five (5) calendar days of Settling Work Defendants becoming aware or receiving notice that repair or maintenance is necessary. If the repairs require more than 5 calendar days to complete U.S. EPA may grant an extension. The schedule for the activities specified in this paragraph may be modified as specified in the U.S. EPA-approved Operation and Maintenance Plan (O&M Plan) to assure the fence is intact and unbreached. Fence inspection and maintenance after construction will be described in the O & M Plan.

If despite installation of the fence, unauthorized entry onto and/or vandalism at the Site exists, U.S. EPA may require the Settling Work Defendants to provide a security guard at the Site. Within 15 days of receipt of such direction from U.S. EPA, Settling Work Defendants will ensure the presence of a security guard at the Site 24 hours per day and continuing until demobilization of Settling Work Defendants' contractor. The Settling Work Defendants will provide adequate Site security measures during implementation of all RD/RA activities, as specified in the U.S. EPA-approved PDDC Work Plan and/or RD and RA Work Plans.

B. Restrictive Covenants/Deed Restrictions

Within thirty (30) days after the effective date of the Consent Decree, Settling Work Defendants will, or will use their best efforts to, have Site owners execute and record restrictive covenants in Appendix F of the Consent Decree with the DuPage County Recorder's Office. Within seventy-five (75) days, Settling Work Defendants will provide notice to U.S. EPA that such restrictive covenants and deed restrictions have been executed and recorded, or provide documentation demonstrating their best efforts to have restrictive covenants executed and recorded .

C. Removal of LNAPL and LNAPL-Contaminated Material (Phase I)

Settling Work Defendants will excavate the area where the LNAPL is located, as approximated in Figure 15 of the ROD, stabilize the excavated material with a suitable stabilizing agent as approved by U.S. EPA, and dispose of the material on the northern half of the Site in a Corrective Action Management Unit (CAMU) as approximated in Figure 15 of the ROD.

Soils and gravels above the LNAPL contaminated vadose zone will be analyzed and managed by Settling Work Defendants or Settling Work Defendant's contractor as clean soils and stored on-site for possible use as backfill. The unconsolidated soils and gravels in the LNAPL contaminated vadose zone will be excavated and managed as described below. The bedrock in the LNAPL contaminated vadose zone must be broken with a backhoe-mounted pneumatic breaker, or other comparable method approved by U.S. EPA, removed using a backhoe bucket or other U.S. EPA approved method, and managed as described below. Dewatering must take place throughout the excavation activity, unless otherwise approved by U.S. EPA. Liquid (LNAPL) recovered during the excavation task shall not be treated on-site; instead Settling Work Defendants may dispose of it off site at a state or federal permitted incineration facility.

The excavation for LNAPL will be performed in stages such that several excavation cells will be placed on Site during most of the construction. One cell will contain material that is in the process of being excavated and awaiting treatment. Another cell may be reserved, if necessary, for the solidification/stabilization (S/S) treatment process.

The excavation for LNAPL is to continue until all visibly-stained soil, gravel, and bedrock is removed or the levels of contaminants remaining in the ground pose no unacceptable risks to human health or the environment.

D. Treatment of LNAPL-Contaminated Material via Solidification/Stabilization (Phase I)

The Settling Work Defendants will treat the material either in an excavation cell or in an on-site blending unit as approved by U.S. EPA. The excavated material will be blended with the stabilization mixture using the parameters and techniques approved by U.S. EPA in the Remedial

Design, which was determined during PDDC studies to be most effective. Samples of stabilized material will be collected periodically by Settling Work Defendants and analyzed using TCLP to confirm that minimal or no leaching of contaminants above TCLP standards will occur in the stabilized soil.

Settling Work Defendants will describe a Sampling and Analysis Program in the PDDC Work Plan that reflects the activities to be taken to determine the location and extent of LNAPL-contaminated materials to be excavated. The Sampling and Analysis Program also will include procedures for sampling and testing of treated soil to determine whether the soil exhibits RCRA hazardous waste characteristics based on TCLP test results.

The RD and RA Work Plans prepared by the Settling Work Defendants will include, at a minimum, the approximate boundaries of the area to be excavated, the estimated volume to be excavated and treated, the location of the CAMU, a program to confirm that adequate excavation has been performed, a plan to address unexpected materials encountered during excavation, as provided in Section II. K of this SOW, and the plan to be followed to restore the excavated areas. Any fill materials which may be required for backfilling or other consolidation purposes must meet the sampling/assessment requirements described under the General Provisions of this SOW, Section II. I.

E. Disposal of Treated Soil in CAMU (Phase I)

Settling Work Defendants will design, construct, and maintain a CAMU on the northern half of the Site as shown in Figure 15 of the ROD. A CAMU is subject to 40 CFR Part 264.552, Subpart S. At a minimum, the CAMU will include the following:

1. A vegetative layer a minimum of 6 inches thick that will sustain plant growth and will reduce erosion and promote drainage.

2. A drainage layer

3. A low permeability, barrier layer that minimizes infiltration. This layer will consist of a compacted clay layer, or a 40 ml low density polyethylene liner over either a geosynthetic clay liner (GCL) or a 2 foot compacted clay layer, and have a maximum hydraulic conductivity of 1×10^{-7} cm/s. This layer, if comprised of clay, will be located below the maximum frost penetration zone recorded in the DuPage County area. The source of clay for the layer is subject to U.S. EPA approval.

4. A bottom liner consisting of compacted clay or a synthetic liner.

Settling Work Defendants will construct the CAMU to minimize the impact to the areas located adjacent to the landfill. The CAMU construction will be integrated and coordinated with fencing activities, and LNAPL-contaminated material excavation activities.

As part of the CAMU design, Settling Work Defendants will confirm, the presence of any buried drainage tiles or pipes that may be present across the Site. If any drainage tiles or pipes are found at the Site, the Settling Work Defendants, with the approval of U.S. EPA, will abandon any such existing drainage system and if deemed necessary, design and provide alternate drainage systems for all potentially affected areas.

Upon completion of the cap, the Settling Work Defendants will vegetate the CAMU cap. Settling Work Defendants will conduct groundwater monitoring and routine maintenance as part of the long term requirements to be established in the O&M Plan.

F. Air Emissions Monitoring (Phase I)

The Settling Work Defendants will perform air emissions monitoring, as directed by the U.S. EPA-approved monitoring plan, to ensure that all applicable air toxins and gas criteria, including the substantive provisions of the applicable Illinois Air Management Regulations, and the Clean Air Act, are met.

G. Alternate Remedies for Phase I

One of the alternate cleanup approaches for Phase I is extraction of the LNAPL using vacuum-enhanced recovery (VER). In this approach, applying a vacuum to a number of extraction wells placed throughout the contaminated area will enhance the removal of the LNAPL from the subsurface. At the same time, any compounds from the subsurface that volatilize and enter the extraction wells will be captured and treated. Air injection wells interspersed among the extraction wells if deemed appropriate by U.S. EPA, may also be installed to ensure that a vacuum is being created.

A second alternate Phase I cleanup approach is *in situ*, or "in place", treatment of the LNAPL using a recently developed application of the technology called low temperature thermal desorption (LTTD). In this approach, no excavation will occur; instead, thermal rods will be placed into the ground to treat the LNAPL-contaminated subsurface via low temperature thermal desorption.

The viability of these alternate remedies will be evaluated during PDDC using bench scale or pilot studies if it appears, after conducting a technical paper review of the technology, that it is practicable and appropriate for the Site.

H. Installation and Operation of a Groundwater, Gradient Control Extraction, Collection and Treatment System (Phase II)

After Phase I has been completed, the Settling Work Defendants will monitor groundwater for at least one year or such longer time as approved by U.S. EPA. The objective of this monitoring period is to assess the effectiveness of the Phase I remedy prior to implementing the Phase II remedy. At the conclusion of the monitoring period, the Settling Work Defendants may petition U.S. EPA to grant a ROD amendment or ESD for an alternate Phase II remedy (e.g. smaller scope pump and treat, monitored natural attenuation, etc.) based upon the monitoring program data, cleanup standards, and existing Agency requirements. U.S. EPA shall have sole discretion to modify the ROD or reject the petition, and such actions are not subject to dispute resolution or other claims under this Consent Decree.

If U.S. EPA concludes, based on the monitoring results and cleanup standards that a pump and treat remedy (Phase II) is required, the Settling Work Defendants will design, construct, operate and maintain an on-site groundwater gradient control, extraction, collection and treatment system to extract groundwater through a series of gradient control wells.

1. Groundwater Gradient Control, Extraction, Collection, Treatment Performance Standards

a. Concentration-Based Performance Standards

The concentration-based performance standards for the gradient control, extraction, collection and treatment system will be contaminant concentration levels sufficient to ensure that groundwater performance standards are met and maintained at the source containment system point-of-compliance.

b. Operational Performance Standards

Settling Work Defendants will design, construct, operate and maintain the groundwater gradient control, extraction, collection and treatment well system to assure and maintain a hydraulic gradient. The design will involve hydrogeologic analyses (e.g., groundwater modeling) to determine the required number of extraction wells and the predicted recovery rates. Settling Work Defendants will provide full technical justification for the recommended number and locations of the gradient control extraction wells. If required by U.S. EPA, Settling Work Defendants will perform field tests prior to the extraction network operation to determine the optimum pumping rate to establish and maintain the required gradient.

Settling Work Defendants will pump extracted groundwater to an on-site groundwater storage and treatment system or a Publicly Owned Treatment Works (POTW). Alternatively, Settling Work Defendants will, upon approval of U.S. EPA, treat the extracted groundwater on-site to meet National Pollutant Discharge Elimination System (NPDES) permit requirements (or substantive requirements in the event that a NPDES permit is not required), and discharge the treated groundwater to the Des Plaines River or the Settling Work Defendants will treat the extracted groundwater through a POTW. Pretreatment requirements prior to discharge to a POTW will depend upon water quality and pretreatment regulations.

Settling Work Defendants will perform treatability studies as U.S. EPA determines necessary in conjunction with utilizing regulatory and industry direct experience to determine the appropriate treatment methods and operating parameters for meeting the applicable discharge standards. The Phase II RD to be approved by U.S. EPA, in consultation with the State, will specify the necessary testing procedures, treatment methods, treatment equipment and operational criteria to be used. Settling Work Defendants will comply with all applicable Federal and State standards.

If surface discharge is being sought, the design of the groundwater gradient control system will also include the design of an on-site groundwater treatment system which will be used to treat the extracted groundwater as required to meet the discharge standards applicable to discharge of the recovered groundwater to the Des Plaines River. If an aeration process (e.g., air stripper) is incorporated into the design, Settling Work Defendants will ensure that the system will comply with all applicable Federal and State air quality standards. Settling Work Defendants will provide full technical justification for the specific type of treatment system proposed. Settling Work Defendants will also determine if the treatment system will need to operate continuously or on a batch mode basis in order to meet NPDES (or substantive requirements) discharge standards.

Settling Work Defendants will identify a proposed discharge point for the recovered groundwater into the Des Plaines River. Settling Work Defendants will coordinate with the appropriate regulatory agencies on the establishment of the discharge standards that would apply to discharge of the recovered groundwater to the Des Plaines River. If the discharge qualifies as an off-site discharge, then Settling Work Defendants will obtain an NPDES discharge permit. The design of the groundwater treatment and discharge system will ensure that the system will comply with all applicable laws and regulations.

2. Groundwater Gradient Control, Extraction, Collection and Treatment System Performance Monitoring

Settling Work Defendants will monitor the performance of the groundwater gradient control, extraction, collection and treatment system by implementing a monitoring program to determine contaminant levels in the groundwater in comparison to Federal MCLs and the substantive provisions of the Illinois State Groundwater Quality Standards, whichever are more stringent, for each of the contaminants detected.

For purposes of monitoring the performance of the groundwater gradient control, extraction, collection and treatment system, Settling Work Defendants will, at a minimum, sample and measure groundwater quality (i.e. levels of parameters of concern) and elevations in U.S. EPA-approved selected well locations on a monthly basis for the first year of operation. During the first year period, a minimum of one (1) sampling event will be analyzed for all TCL, TAL and any other U.S. EPA-designated compounds as directed in the RD/RA Work Plan(s).

After the first year of operation, Settling Work Defendants will sample U.S. EPA-approved well locations at a minimum, on a quarterly basis (with full TCL/TAL and U.S. EPA-designated compound scans once per year). After two (2) years of quarterly monitoring, Settling Work Defendants may petition U.S. EPA to reduce the monitoring frequency, parameters and well locations.

If required by U.S. EPA, Settling Work Defendants will perform additional sampling and/or analysis, if elevated or fluctuating contaminant levels are noted in any monitoring event at a U.S. EPA-approved well location.

If Settling Work Defendants detect new contaminants in any monitoring event at a U.S. EPA-approved well location, they will resample to confirm the detection and then, if confirmed to be present, they will monitor this contaminant as an additional parameter of concern until it is not detected in four (4) consecutive sampling events.

Additional parameters of concern may be specified by U.S. EPA, based on confirmed sampling results.

Settling Work Defendants will submit to U.S. EPA a report of all sample data generated by monitoring activities at a frequency approved by U.S. EPA in the sampling plan. The report will include a discussion of the potential significance, source and impact of contaminants detected, a preliminary list of proposed modifications, additions, and deletions of analytical monitoring parameters and frequencies for future sampling events, and a rationale for such proposed changes. U.S. EPA will consider this report in determining parameters of concern and monitoring frequencies for subsequent sampling events.

I. General Provisions

All soils, clay and fill materials used for site backfilling activities and the CAMU construction will be subject to U.S. EPA approval. Settling Work Defendants will test representative samples of soils, clay and fill materials used for backfilling and for cap construction prior to their use. All soils, clay and fill materials and construction materials will be sampled and analyzed as directed in the PDDC Work Plan and RD Work Plan(s) to verify that background concentrations and Federal and State MCLs are not exceeded.

In making its determination regarding acceptability of fill and construction materials, U.S. EPA will consider the nature of the material and levels of substances occurring naturally within the materials.

Additionally, Settling Work Defendants will conduct physical tests on fill and construction materials to establish their suitability for their intended use, as described in the work plans.

The Settling Work Defendants will propose schedules for construction and operation of the remedial components. U.S. EPA will approve or disapprove schedules, including, if determined appropriate by U.S. EPA, schedules for phased or delayed installation of remedial components, after considering available information, including PDDC Investigations and Studies results.

J. Sampling and Monitoring Programs for Remedial Action

Settling Work Defendants will use monitoring results of groundwater, surface water, and soil sampling to demonstrate compliance or non-compliance with the Consent Decree, the SOW, and ARARs. Settling Work Defendants will also use these monitoring results to assist in the design, construction, implementation, operation and maintenance of the remedial action, and to assess the need for additional remedial actions at, adjacent to, or related to the Site.

Settling Work Defendants will perform the following sampling and monitoring activities pursuant to the requirements of this SOW, as described above:

1. Contaminated Soil Excavation

    a. Soil Sampling

    b. Fill/Construction Material Sampling

2. CAMU Cap Construction

    a. Fill/Construction Material Sampling

3. Groundwater gradient control, extraction, collection and treatment

a. Performance Monitoring

In addition to the above-listed sampling and monitoring activities, the sampling and monitoring activities listed below will be performed by Settling Work Defendants.

4. Multi-media Monitoring

As required by the U.S. EPA-approved RD(s), the Settling Work Defendants will implement a multi-media monitoring program designed to detect changes in the concentrations of contaminants in the groundwater and surface water downgradient from the Site. This program will provide comprehensive information by which to assess the present and future impact of the Site on all environmental media.

Settling Work Defendants will specify an interim monitoring plan for groundwater in the PDDC Work Plan for U.S. EPA approval. The plan will also specify the groundwater monitoring frequency of existing and new wells installed during the PDDC Investigations and Studies to be conducted in accordance with the PDDC Work Plan. Settling Work Defendants will analyze the first round of samples during the PDDC Investigations and Studies for a full scan, including, but not limited to, all TCL and TAL compounds (as specified in the PDDC Work Plan), which will constitute the first annual sampling event. Settling Work Defendants will perform subsequent quarterly monitoring for parameters of concern specified in the PDDC Work Plan or as otherwise approved by U.S. EPA. In the event that the interim monitoring period extends beyond one year, the Settling Work Defendants may petition the U.S. EPA to modify the scope and frequency of the monitoring program. Any modification is subject to U.S. EPA approval.

The interim monitoring program will be in effect until U.S. EPA approves the RD. Thereafter, groundwater monitoring will be subject to the RD requirements or as otherwise specified by U.S. EPA.

Monitoring activities will include, but are not limited to, collection and field and laboratory analysis of samples from monitoring wells and sampling locations designated in the PDDC Work Plan and RD(s). Field analyses will include, at a minimum, groundwater elevation, pH, temperature, and specific conductivity. Laboratory analyses may include TCL and TAL compounds as determined by U.S. EPA.

5. Supplemental Sampling

In addition to the monitoring described in Section II.J.1-4, Settling Work Defendants shall conduct within 14 days supplemental random sampling as directed by U.S. EPA in writing. The purpose of the supplemental sampling will be limited to verifying the satisfactory

performance of the remedy. Situations which may trigger supplemental sampling include, but are not limited to, high precipitation events, flooding and equipment failure.

6. Integration of Monitoring Programs

To the extent practicable, the various independent monitoring programs required by this SOW should be integrated to avoid unnecessary duplication. Settling Work Defendants will take into consideration factors such as well installation and construction, sampling and analysis procedures, and quality assurance and quality control in designing the monitoring programs, in order to assure consistency and usability of wells, sample points, samples and data for more than one monitoring program.

Settling Work Defendants will remain obligated, however, to execute each particular monitoring program independently of any other monitoring program, even if this requires duplication of effort.

K. Correction of Remedial Action Deficiencies/Additional Response Actions

Settling Work Defendants will review data for indications of unusual or unanticipated site conditions which the RA may not fully address. Settling Work Defendants will immediately report each such site condition to U.S. EPA. Settling Work Defendants will take into account the site conditions, the existing RA obligations, and will propose corrective actions as provided by this Consent Decree (work plan modification, additional work, etc...). In addition, Settling Work Defendants will submit a plan to address the discovery and need for excavation of previously undetected wastes, such as additional contaminated soils encountered during any excavation for U.S. EPA's approval (as part of the RD and RA Work Plans).

III. PRE-DESIGN DATA COLLECTION

A. Settling Work Defendants will perform investigations and studies to support the Lenz Oil Remedial Design activities as part of the PDDC phase. The PDDC studies will incorporate all aspects of pre-design activities necessary to develop a remedial design. The required investigations shall, at a minimum, achieve the following objectives:

1. Further investigate and evaluate the selected and contingent remedies;

2. Obtain information to assist in the design, construction, implementation, operation, and maintenance of the remedial action;

3. Obtain information to identify, assess, evaluate and minimize the adverse impacts to areas associated with the remedial activities at the Site;

4. Fence and warning sign installation if equipment and/or any sampling activities are on-site more than 24-hours or take more than 24-hours to complete.

B. Upon U.S. EPA approval of the PDDC Work Plan for the investigations described below, the Settling Work Defendants will implement the investigations, as directed by and in accordance with the applicable approved plan and schedule.

1. Confirmatory and Supplemental Data Gathering Activities

a. Hydrogeological Investigation

The Settling Work Defendants will submit to U.S. EPA a PDDC Work Plan including, but not limited to, a plan to conduct a hydrogeological study of the Site and surrounding areas. A substantial amount of field study has already been completed during the RI/FS and data collected to date will be used to characterize the Site hydrogeology wherever possible.

The purpose of the hydrogeological investigation and study is to verify and update the current characterization of the local hydrogeological setting and associated conditions as it relates to the Site and the ROD remedy. At a minimum, the Settling Work Defendants will obtain the following information:

(1) Verify the presence, or lack thereof, of all geological formations present beneath the Site and the surrounding areas down to and including the lower aquifer and the clay-till layer between the upper and lower aquifers, and identify the thicknesses of all formations present as well as defining and explaining variations of the thicknesses of each formation;

(2) Identify all potential aquifer or water-bearing systems;

(3) Verify or define local and Site-specific flow directions of all water-bearing systems;

(4) Identify all human-made changes to the local area which directly impact the flow characteristics of each aquifer;

(5) Identify or verify the hydraulic connection of all aquifers;

(6) Identify all surface water bodies in the area which impact groundwater flow characteristics. Each water body shall be identified and/or verified as a groundwater discharge or recharge surface water body; and

(7) Determine the actual groundwater receptors of potential contaminated groundwater affected by the Site.

The hydrogeological investigation will be implemented by the Settling Work Defendants as outlined in the PDDC Work Plan, as approved by U.S. EPA.

b. Extent-of-Contamination (EOC) Investigations.

(1) LNAPL-contamination Investigation

The Settling Work Defendants will develop methods to identify definitively the lateral extent of the LNAPL contamination associated with the Site. Such investigation may be necessary to determine the exact location of the LNAPL. These methods will be specified in the PDDC Work Plan and will be implemented upon U.S. EPA approval of the PDDC Work Plan.

2. Study of the Remedy's Effects on the Environment, Potential Wetlands and Program to Minimize Adverse Effects

The Settling Work Defendants will develop and implement a study which will provide information on the potential environmental impacts which could occur during remedial activities at the Site. The study will identify potential wetlands, biota, water bodies and other media (flood way/floodplain) which exist in the vicinity of the Site, and will identify those media which may be affected by any remedial activities.

The Settling Work Defendants will identify potential environmental impacts of the remedial action, and, upon U.S. EPA approval, will develop and implement a program to minimize and reverse any on-site and off-site environmental impacts associated with design, construction, implementation, operation and maintenance of the remedial action.

Settling Work Defendants will conduct a wetlands assessment to determine if wetlands exist near the Site. If wetlands do exist, the program shall include a determination of the portions of the wetlands that are or may be affected by the remedy, and a plan for restoring or replacing any wetlands destroyed as a result of the remedial action. Any activities which take place in wetlands will be conducted in

compliance with §404 of the Clean Water Act, 33 U.S.C. §1344, and regulations promulgated thereunder, 40 CFR §230, Federal Executive Order 11990 for protection of wetlands, and substantive State standards, as applicable.

Settling Work Defendants will coordinate the study and potential mitigation program with the U.S. EPA, U. S. Army Corp of Engineers, U.S. Department of the Interior, State, and local authorities.

IV. SCOPE OF REMEDIAL DESIGN AND REMEDIAL ACTION

The Remedial Design/Remedial Action will consist of the following five tasks. All plans are subject to U.S. EPA approval.

Task I: PDDC Work Plan

Task II: Phase I RD Work Plan

Task III: Phase I Remedial Design

1. Design Plans and Specifications
2. Operation and Maintenance Plan
3. Cost Estimate
4. Project Construction Schedule
5. Construction Quality Assurance Objectives
6. Design Phases
    a. Preliminary Design
    b. Intermediate Design (Briefing)
    c. Pre-final Design/Final Design
7. Community Relations Support

Task IV: Phase I Remedial Action Construction

1. Remedial Action Work Plan

2. Construction Quality Assurance Program Plan

    a. Responsibility and Authority
    b. Construction Quality Assurance Personnel Qualifications
    c. Inspection Activities
    d. Documentation

3. Implementation of CQA Program Plan

Task V: Phase II RD Work Plan

Task VI: Phase II Remedial Design

1. Design Plans and Specifications
2. Operation and Maintenance
3. Cost Estimate
4. Project Construction Schedule
5. Construction Quality Assurance Objectives
6. Design Phases
    a. Preliminary Design
    b. Intermediate Design (Briefing)
    c. Pre-final Design/Final Design
7. Community Relations Support

Task VII: Phase II Remedial Action Construction

1. Remedial Action Work Plan

2. Construction Quality Assurance Program Plan
    a. Responsibility and Authority
    b. Construction Quality Assurance Personnel Qualifications
    c. Inspection Activities
    d. Documentation

3. Implementation of CQA Program Plan

Task VIII: Reports and Submissions

1. Progress Reports
2. Draft Reports and Submissions
3. Final Reports and Submissions

Task I: PDDC Work Plan

Settling Work Defendants will submit for U.S. EPA approval, the PDDC Work Plan which will describe the overall management strategy for performing the required PDDC Investigations and Studies, in accordance with the schedule set forth below in Section V. The PDDC Work Plan will document the responsibility and authority of all organizations and key personnel involved with the implementation of the PDDC Investigations and Studies required under the Consent Decree and this

SOW. The PDDC Work Plan will also include a description of qualifications of key personnel directing the PDDC Work, including contractor personnel. The Settling Work Defendants will submit the PDDC Work Plan according to the schedule identified in Section V of this SOW.

The PDDC Work Plan will include plans for:

1. Technical Memorandum for Hydrogeological Investigation;

2. Source Removal Pre-Design Study including EOC investigations, and investigations to determine the lateral extent of the LNAPL contamination, and Technical Memoranda;

3. CAMU Cap Pre-Design Study;

4. Fence and warning sign installation;

5. PDDC Quality Assurance Project Plan;

6. PDDC Sampling Plan;

7. Health and Safety Plan for all PDDC work activities, including air, groundwater, soil, sediment, and surface water monitoring, sampling and analysis. The Settling Work Defendants will develop a H&S Plan which is designed to protect on-site personnel and area residents from physical, chemical and all other hazards posed by this. The H&S Plan will develop the performance levels and criteria necessary to address the following areas.

   - Facility Description
   - Personnel
   - Levels of protection
   - Safe work practices and safeguards
   - Medical surveillance
   - Personal and environmental air monitoring
   - Personal protective equipment
   - Personal hygiene
   - Decontamination - personal and equipment
   - Site work zones
   - Contaminant control
   - Contingency and emergency planning
   - Logs, reports and record keeping

The H&S Plan will follow U.S. EPA guidance and all OSHA requirements as outlined in 29 CFR 1910 and 1926. The H&S Plan will include a Contingency Plan describing procedures to be used in the event of an accident or emergency at the Site. The Contingency Plan will include, at a minimum, the following:

a. Name of the person or entity responsible for responding in the event of an emergency incident.

b. Plan and schedule date(s) within 30 days after the submission of the draft H&S Plan for meetings with the local community, including local, State, and Federal agencies involved in the cleanup, as well as local emergency squads and hospitals.

c. First aid medical information.

d. Air Monitoring Plan (if applicable).

e. Spill Prevention, Control, and Countermeasures (SPCC) Plan (if applicable), as specified in 40 CFR Part 109 describing measures to prevent and contingency plans for potential spills and discharges from materials handling and transportation.

The draft and final H&S Plan will be submitted with the PDDC Work Plan.

8. Identification and delineation of sensitive environments (including, but not limited to wetlands), a study of the Remedy's effects on the environment, and a wetlands assessment;

9. The Program for mitigation of the remedy's environmental effects during PDDC Investigations and Studies; and

10. A project schedule for each major activity and submission to be completed in the pre-remedial design phase, excluding deliverables.

Settling Work Defendants will report the results in the PDDC Investigations and Studies Report, and will submit the results as required by the applicable PDDC Schedule. Settling Work Defendants will submit a PDDC Investigations and Studies Report according to the schedule identified in Section V of the SOW.

Task II: Phase I Remedial Design Work Plan

1. Remedial Design Work Plan

The Settling Work Defendants will submit for U.S. EPA review and approval, a RD Work Plan which will describe the overall management strategy for performing the design, in accordance with the schedule set forth below in Section V. The RD Work Plan will document the responsibility and authority of all organizations and key personnel involved with the implementation of the work required under the Consent Decree and this SOW. The RD Work Plan will also include a description of qualifications of key personnel directing the RD, including contractor personnel. The Settling Work Defendants will submit a RD Work Plan according to the schedule identified in Section V of this SOW.

The RD Work Plan (if Alternative 9A is implemented) will include, at a minimum, the following activities and plans:

a. Work plan for the excavation and off-site treatment of recovered LNAPL;

b. Work plan for the excavation, removal, on-site treatment and/or disposal of LNAPL-contaminated materials;

c. Work plan for the design and construction of the CAMU cap;

d. Work plan for the storage, treatment and discharge of recovered groundwater;

e. Work plan for the investigation, sampling and analysis of soil, clay and material to be used for fill, backfilling, and the CAMU cap;

f. A RD Monitoring, Sampling and Analysis Plan for all air, groundwater, soil, sediment, and surface water monitoring, sampling and analysis activities required by this SOW (other than those required by the PDDC Work Plan), specified in Section II. J. of this SOW;

g. A RD Health and Safety Plan, as described in Section IV, Task I.7;

h. A RD QAPP (amended/updated from the QAPP done during the PDDC Work Plan);

i. A work plan for the program for the mitigation of environmental effects during remedial activities.

The RD Work Plan (if Alternative 10 is implemented) will include, at a minimum, the following activities and plans:

a. Work plan for the extraction and off-site treatment of recovered LNAPL;

b. Work plan for the extraction, removal, on-site treatment and/or disposal of LNAPL-contaminated materials;

c. Work plan for the design and construction of the vacuum enhanced recovery system;

d. Work plan for the storage, treatment and discharge of recovered groundwater;

e. A RD Monitoring, Sampling and Analysis Plan for all air, groundwater, soil, sediment, and surface water monitoring, sampling and analysis activities required by this SOW (other than those required by the PDDC Work Plan), specified in Section II. J. of this SOW;

f. A RD Health and Safety Plan, as described in Section IV, Task I.7;

g. A RD QAPP (amended/updated from the QAPP done during the PDDC Work Plan);

h. A work plan for the program for the mitigation of environmental effects during remedial activities.

The RD Work Plan (if Alternative 11 is implemented) will include, at a minimum, the following activities and plans:

a. Work plan for the *in situ* LTTD treatment of LNAPL;

b. Work plan for the removal, on-site treatment and/or disposal of LNAPL-contaminated materials (gas and condensate);

c. Work plan for the design and construction of the *in situ* LTTD system;

d. Work plan for the storage, treatment and discharge of recovered groundwater;

e. A RD Monitoring, Sampling and Analysis Plan for all air, groundwater, soil, sediment, and surface water monitoring, sampling and analysis activities required by this SOW (other than those required by the PDDC Work Plan), specified in Section II. J. of this SOW;

f. A RD Health and Safety Plan, as described in Section IV, Task I.7;

g. A RD QAPP (amended/updated from the QAPP done during the PDDC Work Plan);

h. A work plan for the program for the mitigation of environmental effects during remedial activities.

As part of the RD Work Plan, the Settling Work Defendants will prepare a RD QAPP (g and h, above) to specify Data Quality Objectives and methods for sampling analysis and data handling. The RD QAPP will be consistent with the requirements of the Data Quality Objectives and the U.S. EPA Contract Lab Program (CLP) for laboratories proposed outside the CLP. At a minimum, the RD QAPP will include the following:

- Statement of Purpose
- Project Description
- Project Organization and Responsibility
- Data Quality Objectives
- Sampling Procedures and Objectives
- Sample Custody and Document Control
- Calibration Procedures and Frequency
- Analytical Procedures Data Reduction, Validation, Assessment and Reporting
- Internal Quality Control Checks and Frequency
- Performance System Checks and Frequency
- Preventive Maintenance Procedures and Frequency
- Data Precision, Accuracy and Completeness Assessment Procedures
- Corrective Action
- Quality Assurance Reporting

Task III: Phase I Remedial Design

1. Design Plans and Specifications

The Settling Work Defendants will prepare final construction plans and specifications to implement the required work at the Site. Subject to approval by U.S. EPA, Settling Work Defendants may submit more than one set of design submittals reflecting different components of the remedy. All plans and specifications will be developed in accordance with U.S. EPA's Superfund Remedial Design and Guidance (OSWER Directive No. 9355.0-4A) and will demonstrate that they meet all objectives of the ROD, the Consent Decree, and this SOW, including all performance standards. The Settling Work Defendants will develop clear and comprehensive design plans and specifications which include, at a minimum:

a. Discussion of the design strategy and the design basis, including:

i. Compliance with all applicable or relevant and appropriate requirements; and

ii. Minimization of environmental and public impacts.

b. Discussion of the technical factors of importance including:

i. Use of currently accepted environmental control measures and technology;

ii. The constructability of the design; and

iii. Use of currently acceptable construction practices and techniques.

c. Description of assumptions made and detailed justification of these assumptions;

d. Discussion of the possible sources of error and references to possible operation and maintenance problems;

e. Detailed drawings of the proposed design including:

i. Qualitative flow sheets; and

ii. Quantitative flow sheets.

f. Tables listing equipment and specifications;

g. Tables giving material and energy balances;

h. Appendices including:

i. Sample calculations (one example presented and explained clearly for significant or unique design calculations);

ii. Derivation of equations essential to understanding of the report; and

iii. Results of laboratory and field tests

2. Operation and Maintenance Plan

The Settling Work Defendants will prepare an Operation and Maintenance Plan (O&M Plan) to cover both implementation and long term maintenance of the remedy. Settling Work Defendants will submit an initial draft O&M Plan simultaneously with the Pre-final Design

submission, and the final O&M Plan will be submitted before the Pre-final Inspection. The plan will include the following elements:

a. Description of normal operation and maintenance:

   i. Description of tasks for operation;

   ii. Description of tasks for maintenance;

   iii. Description of prescribed treatment or operation conditions; and

   iv. Schedule showing frequency of each O&M task.

b. Description of potential operating problems:

   i. Description and analysis of potential operation problems;

   ii. Sources of information regarding problems; and

   iii. Common and anticipated remedies.

c. Description of routine monitoring and laboratory testing:

   i. Description of monitoring tasks;

   ii. Description of required laboratory tasks and their interpretation;

   iii. Required data collection; and

   iv. Schedule of monitoring frequency;

d. Description of alternate O&M:

   i. Should system or any component of the system fail, corrective actions to be taken by the Settling Work Defendants; and

   ii. Analysis of vulnerability and additional resource requirements should a failure occur.

e. Corrective Action:

i. Description of corrective action to be implemented in the event that clean-up standards or performance standards are not met; and

ii. Schedule for implementing these corrective actions.

f. Safety Plan:

i. Description of precautions, of necessary equipment, etc., for Site personnel; and

ii. Safety tasks required in event of a system failure.

g. Description of equipment:

i. Equipment identification;

ii. Installation of monitoring components;

iii. Maintenance of Site equipment; and

iv. Replacement schedule for equipment and installed components.

h. Records and reporting mechanisms required:

i. Daily operating logs;

ii. Laboratory records;

iii. Records for operating costs;

iv. Mechanism for reporting emergencies;

v. Personnel and maintenance records; and

vi. Monthly/annual reports to State agencies.

3. Cost Estimate

The Settling Work Defendants will refine the cost estimate developed in the Feasibility Study to reflect the more detailed/accurate design plans and specifications being developed by Settling Work Defendants in the Remedial Design. The cost estimate will include both capital and operation and maintenance costs. An initial cost estimate will be submitted

simultaneously with the Pre-final Design submission and the final cost estimate with the Final Design submission.

4. Project Schedule

The Settling Work Defendants will develop a project schedule, consistent with the schedule contained in Section V of the SOW, for design, construction and implementation of the remedy which identifies timing for initiation and completion of all critical path tasks. Settling Work Defendants will specifically identify deadlines for completion of the project and major interim milestones. A draft project schedule will be submitted simultaneously with the Pre-final Design submission and the final project schedule with the Final Design submission. The proposed RA excavation of the contaminated vadose zone start date may be established to coincide with anticipated low water table conditions.

5. Construction Quality Assurance Objectives

The Settling Work Defendants will identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements and documentation.

6. Design Phases

The Settling Work Defendants will meet regularly with U.S. EPA to discuss design issues. The design of the Work will include the phases outlined below.

a. Preliminary Design

Settling Work Defendants will submit the Preliminary Design representing a design effort which is approximately 30% complete. The Preliminary Design submission will include or discuss, at a minimum, the following:

- Preliminary plans, drawings, and sketches, including design calculations;
- Results of PDDC studies and additional field sampling;
- Design assumptions and parameters, including design restrictions, process performance criteria, appropriate unit processes for the treatment train, and expected removal or treatment efficiencies for both the process and waste (concentration and volume);

- Proposed cleanup verification methods, including compliance with Applicable or Relevant and Appropriate Requirements (ARARs);
- Outline of required specifications;
- Proposed siting/locations of processes/construction activity;
- Expected long-term monitoring and operation requirements;
- Real estate, easement, and permit requirements;
- Preliminary construction schedule, including contracting strategy.

b. Intermediate Design (Briefing)

If an Intermediate Design is required, the Settling Work Defendants will present/submit an Intermediate Design (Briefing) representing a design effort which is approximately 60% complete, in accordance with Section V of the SOW. The Intermediate Design (Briefing) will fully address all comments made to the preceding design submittal. The Intermediate Design (Briefing) will include those elements listed for the Preliminary Design, as well as, the following:

- Draft Performance Standard Verification Plan;
- Draft QAPP;
- Draft Health and Safety Plan.

c. Pre-final/Final Design

Settling Work Defendants will submit the Pre-final Design representing a design effort which is approximately 95% complete and will submit the Final Design representing a design effort which is 100% complete. The Pre-final Design will fully address all comments made on the Intermediate Design (Briefing). The Final Design will fully address all comments made on the Pre-final Design and will include reproducible drawings and specifications suitable for bid advertisement. The Pre-final Design will serve as the Final Design if U.S. EPA has no further comments and issues the notice to proceed.

The Pre-final and Final Design submittals will include those elements listed for the Preliminary Design, as well as the following. Settling Work Defendants will submit

draft and final submittals concurrently with the Pre-final and Final design phases, respectively:

- Draft/Final Performance Standard Verification Plan;
- Draft/Final Construction Quality Assurance Plan;
- Draft/Final Construction Design Plans and Specifications;
- Final QAPP;
- Draft/Final H & S Plan;
- Draft Operation and Maintenance Plan;
- Draft/Final Capital and Operation and Maintenance Cost Estimate. This cost estimate will refine the FS cost estimate to reflect the detail presented in the Final Design; and
- Draft/Final Project Schedule for the construction and implementation of the remedy which identifies timing for initiation and completion of all critical path tasks. The final project schedule submitted as part of the Final Design will include specific deadlines for completion of the project and major milestones.

7. Community Relations Support

A community relations program will be implemented by U.S. EPA in consultation with Illinois EPA. The Settling Work Defendants will cooperate with the U.S. EPA and Illinois EPA by participating in the preparation of all appropriate information disseminated to the public and in public meetings that may be held or sponsored by the U.S. EPA or Illinois EPA to explain activities at or concerning the Site.

Community relations support will be consistent with Superfund community relations policy as stated in the "Guidance for Implementing the Superfund Program" and "Community Relations in Superfund - A Handbook".

8. Additional Studies

The U.S. EPA, in consultation with Illinois EPA, may require the Settling Work Defendants to perform additional studies to supplement the available technical data or as otherwise

needed. The Settling Work Defendants will furnish all equipment, personnel and funding necessary to complete any additional studies needed.

TASK IV: Phase I Remedial Action Construction

A. The Settling Work Defendants will implement the RA as detailed in the approved Design.

B. The following activities will be completed in constructing the RA:

1. RA Work Plan

The Settling Work Defendants shall prepare and submit for approval, to U.S. EPA, a Remedial Action Work Plan (RA Work Plan) for implementation of the RA. Any questions concerning design requirements or specifications shall be noted in the draft of this document. The document shall outline the overall management strategy for performing the construction, operation, maintenance and monitoring of the RA. The RA Work Plan shall include a project schedule for each major activity and submission of deliverables generated during the RA as well as a schedule for completion of the RA.

The RA Work Plan shall also include a description of qualifications of key personnel directing the RA, including contractor personnel. The Settling Work Defendants shall submit a RA Work Plan according to the schedule identified in Section V of the SOW. Upon approval of the RA Work Plan by U.S. EPA, Settling Work Defendants shall implement the activities set forth therein in accordance with the approved schedule.

2. Construction Quality Assurance Program Plan

The Settling Work Defendants will submit a draft Construction Quality Assurance Program (CQA) Plan, in accordance with Section V of the SOW. The Settling Work Defendants will finalize the Construction Quality Assurance Plan incorporating comments received on the draft Construction Quality Assurance Plan, in accordance with the schedule in Section V of the SOW.

The CQA Plan will assure that a completed remedy will meet or exceed all design criteria, plans and specifications. The CQA plan is a Site-specific document which must be approved by U.S. EPA prior to the start of the construction. At a minimum, the CQA plan should include the elements which are summarized below.

a. Responsibility and Authority

The Settling Work Defendants will describe fully in the CQA Plan the responsibility and authority of all organizations (i.e., technical consultants, construction firms, etc.) and key personnel involved in the construction of the corrective measure. The Settling Work Defendants will also identify a CQA officer and the necessary supporting inspection staff.

b. Construction Quality Assurance Personnel Qualifications

The Settling Work Defendants will set forth the qualifications of the CQA Officer and supporting inspection personnel in the CQA plan to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities.

c. Inspection Activities

The Settling Work Defendants will summarize in the CQA plan the observations and tests that will be used to monitor the construction and/or installation of the components of the remedial action. The plan will include the scope and frequency of each type of inspection. Inspections will verify and document compliance with environmental requirements and include, but not be limited to air quality and emissions monitoring records, waste disposal records (e.g., RCRA transportation manifests), etc. The inspection will also ensure compliance with all health and safety procedures. In addition to the oversight inspections, the Settling Work Defendants will conduct the following activities:

i. Preconstruction inspection and meeting

The Settling Work Defendants will conduct a preconstruction inspection and meeting to:

- Review methods for documenting and reporting inspection data;
- Review methods for distributing and storing documents and reports;
- Review work area security and safety protocol;
- Discuss any appropriate modifications of the construction quality assurance plan to ensure that Site-specific considerations are addressed; and
- Conduct a Site walk-around to verify that the design criteria, plans and specifications are clearly understood and to review material and equipment storage locations.

The preconstruction inspection and meeting will be documented by a designated person and minutes will be transmitted to representatives of the

Parties to the Consent Decree in accordance with the schedule in Section V of the SOW.

ii. Pre-final inspection

Upon preliminary project construction completion, Settling Work Defendants will notify U.S. EPA for the purposes of conducting a pre-final inspection. The pre-final inspection will consist of a walk-through inspection of the entire project Site. The inspection will be conducted to determine whether the project is complete and consistent with the contract documents and the U.S. EPA-approved remedial action. Any outstanding construction items discovered during the pre-final inspection will be identified and noted. Additionally, all operating systems and equipment will be operationally tested by Settling Work Defendants.

The Settling Work Defendants will certify that the remedy will perform as designed and that all specifications have been met. Settling Work Defendants will correct deficiencies noted during the pre-final inspection and will initiate and complete retesting, as directed by U.S. EPA. The Settling Work Defendants will submit a Pre-final Inspection Report to U.S. EPA for approval within thirty (30) days of the pre-final inspection, outlining the outstanding construction items, actions required to resolve such items, the completion date for these items and the date for the final inspection.

iii. Final inspection

The final inspection will take place no later than thirty (30) days after the submission of the Pre-final Inspection Report. The final inspection will consist of a walk-through inspection of the project Site. The U.S. EPA-approved Pre-final Inspection Report will be used as a checklist for the final inspection. The final inspection will focus on the outstanding construction items identified in the pre-final inspection. At the time of the final inspection, Settling Work Defendants will certify that all outstanding items have been resolved.

d. Documentation

The Settling Work Defendants will describe in detail in the CQA plan the reporting requirements for CQA activities. This will include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports and final documentation. Provisions for the final storage of all records will be presented in the CQA plan.

3. Implementation of CQA Plan

As approved in the Final Project Schedule, Settling Work Defendants will construct and implement the remedy in accordance with the approved design, schedule and CQA plan.

Task V: Phase II Remedial Design Work Plan

1. Remedial Design Work Plan

The Settling Work Defendants will submit for U.S. EPA review and approval, a RD Work Plan which will describe the overall management strategy for performing the design, in accordance with the schedule set forth below in Section V. The RD Work Plan will document the responsibility and authority of all organizations and key personnel involved with the implementation of the work required under the Consent Decree and this SOW. The RD Work Plan will also include a description of qualifications of key personnel directing the RD, including contractor personnel. The Settling Work Defendants will submit a RD Work Plan according to the schedule identified in Section V of this SOW.

The RD Work Plan will include, at a minimum, the following activities and plans:

a. Work plan for the design and construction of the groundwater gradient control, extraction, collection and treatment system;

b. Work plan for the storage, treatment and discharge of recovered groundwater;

c. A RD Monitoring, Sampling and Analysis Plan for all air, groundwater, soil, sediment, and surface water monitoring, sampling and analysis activities required by this SOW (other than those required by the PDDC Work Plan), specified in Section II. J. of this SOW;

d. A RD Health and Safety Plan, as described in Section IV, Task I.7;

e. A RD QAPP (amended/updated from the QAPP done during the PDDC Work Plan);

f. A work plan for the program for the mitigation of environmental effects during remedial activities.

As part of the RD Work Plan, the Settling Work Defendants will prepare a RD QAPP (e, above) to specify Data Quality Objectives and methods for sampling analysis and data handling. The RD QAPP will be consistent with the requirements of the Data Quality Objectives and the U.S. EPA Contract Lab Program (CLP) for

laboratories proposed outside the CLP. At a minimum, the RD QAPP will include the following:

- Statement of Purpose
- Project Description
- Project Organization and Responsibility
- Data Quality Objectives
- Sample Custody and Document Control
- Calibration Procedures and Frequency
- Analytical Procedures Data Reduction, Validation, Assessment and Reporting
- Internal Quality Control Checks and Frequency
- Performance System Checks and Frequency
- Preventive Maintenance Procedures and Frequency
- Data Precision, Accuracy and Completeness Assessment Procedures
- Corrective Action
- Quality Assurance Reporting

Task VI: Phase II Remedial Design

1. Design Plans and Specifications

The Settling Work Defendants will prepare final construction plans and specifications to implement the required work at the Site. Subject to approval by U.S. EPA, Settling Work Defendants may submit more than one set of design submittals reflecting different components of the remedy. All plans and specifications will be developed in accordance with U.S. EPA's Superfund Remedial Design and Guidance (OSWER Directive No. 9355.0-4A) and will demonstrate that they meet all objectives of the ROD, the Consent Decree, and this SOW, including all performance standards. The Settling Work Defendants will develop clear and comprehensive design plans and specifications which include, at a minimum:

a. Discussion of the design strategy and the design basis, including:

   i. Compliance with all applicable or relevant and appropriate requirements; and

   ii. Minimization of environmental and public impacts.

b. Discussion of the technical factors of importance including:

   i. Use of currently accepted environmental control measures and technology;

ii. The constructability of the design; and

iii. Use of currently acceptable construction practices and techniques.

c. Description of assumptions made and detailed justification of these assumptions;

d. Discussion of the possible sources of error and references to possible operation and maintenance problems;

e. Detailed drawings of the proposed design including:

i. Qualitative flow sheets; and

ii. Quantitative flow sheets.

f. Tables listing equipment and specifications;

g. Tables giving material and energy balances;

h. Appendices including:

i. Sample calculations (one example presented and explained clearly for significant or unique design calculations);

ii. Derivation of equations essential to understanding of the report; and

iii. Results of laboratory and field tests

2. Operation and Maintenance Plan

The Settling Work Defendants will prepare an Operation and Maintenance Plan (O&M Plan) to cover both implementation and long term maintenance of the remedy. Settling Work Defendants will submit an initial draft O&M Plan simultaneously with the Pre-final Design Document submission, and the final O&M Plan will be submitted before the Pre-final Inspection. The plan will include the following elements:

a. Description of normal operation and maintenance:

i. Description of tasks for operation;

ii. Description of tasks for maintenance;

iii. Description of prescribed treatment or operation conditions; and

iv. Schedule showing frequency of each O&M task.

b. Description of potential operating problems:

i. Description and analysis of potential operation problems;

ii. Sources of information regarding problems; and

iii. Common and anticipated remedies.

c. Description of routine monitoring and laboratory testing:

i. Description of monitoring tasks;

ii. Description of required laboratory tasks and their interpretation;

iii. Required data collection; and

iv. Schedule of monitoring frequency;

d. Description of alternate O&M:

i. Should system or any component of the system fail, corrective actions to be taken by the Settling Work Defendants; and

ii. Analysis of vulnerability and additional resource requirements should a failure occur.

e. Corrective Action:

i. Description of corrective action to be implemented in the event that clean-up standards or performance standards are not met; and

ii. Schedule for implementing these corrective actions.

f. Safety Plan:

i. Description of precautions, of necessary equipment, etc., for Site personnel; and

ii. Safety tasks required in event of a system failure.

g. Description of equipment:

i. Equipment identification;

ii. Installation of monitoring components;

iii. Maintenance of Site equipment; and

iv. Replacement schedule for equipment and installed components.

h. Records and reporting mechanisms required:

i. Daily operating logs;

ii. Laboratory records;

iii. Records for operating costs;

iv. Mechanism for reporting emergencies;

v. Personnel and maintenance records; and

vi. Monthly/annual reports to State agencies.

3. Cost Estimate

The Settling Work Defendants will refine the cost estimate developed in the Feasibility Study to reflect the more detailed/accurate design plans and specifications being developed by Settling Work Defendants in the Remedial Design. The cost estimate will include both capital and operation and maintenance costs. An initial cost estimate will be submitted simultaneously with the Pre-final Design submission and the final cost estimate with the Final Design submission.

4. Project Schedule

The Settling Work Defendants will develop a project schedule, consistent with the schedule contained in Section V of the SOW, for design, construction and implementation of the remedy which identifies timing for initiation and completion of all critical path tasks. Settling Work Defendants will specifically identify deadlines for completion of the project and major interim milestones. A draft project schedule will be submitted simultaneously

with the Pre-final Design submission and the final project schedule with the Final Design submission.

5. Construction Quality Assurance Objectives

The Settling Work Defendants will identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements and documentation.

6. Design Phases

The Settling Work Defendants will meet regularly with U.S. EPA to discuss design issues. The design of the Work will include the phases outlined below.

a. Preliminary Design

Settling Work Defendants will submit the Preliminary Design representing a design effort which is approximately 30% complete. The Preliminary Design submission will include or discuss, at a minimum, the following:

- Preliminary plans, drawings, and sketches, including design calculations;
- Results of PDDC studies and additional field sampling;
- Design assumptions and parameters, including design restrictions, process performance criteria, appropriate unit processes for the treatment train, and expected removal or treatment efficiencies for both the process and waste (concentration and volume);
- Proposed cleanup verification methods, including compliance with Applicable or Relevant and Appropriate Requirements (ARARs);
- Outline of required specifications;
- Proposed siting/locations of processes/construction activity;
- Expected long-term monitoring and operation requirements;
- Real estate, easement, and permit requirements;
- Preliminary construction schedule, including contracting strategy.

b. Intermediate Design (Briefing)

If an Intermediate Design is required, the Settling Work Defendants will present/submit an Intermediate Design (Briefing) representing a design effort which is approximately 60% complete, in accordance with Section V of the SOW. The Intermediate Design (Briefing) will fully address all comments made to the preceding design submittal. The Intermediate Design (Briefing) will include those elements listed for the Preliminary Design, as well as, the following:

- Draft Performance Standard Verification Plan;
- Draft QAPP;
- Draft Health and Safety Plan.

c. Pre-final/Final Design

Settling Work Defendants will submit the Pre-final Design representing a design effort which is approximately 95% complete and will submit the Final Design representing a design effort which is 100% complete. The Pre-final Design will fully address all comments made on the Intermediate Design (Briefing). The Final Design will fully address all comments made on the Pre-final Design and will include reproducible drawings and specifications suitable for bid advertisement. The Pre-final Design will serve as the Final Design if U.S. EPA has no further comments and issues the notice to proceed.

The Pre-final and Final Design submittals will include those elements listed for the Preliminary Design, as well as the following. Settling Work Defendants will submit draft and final submittals concurrently with the Pre-final and Final design phases, respectively:

- Draft/Final Performance Standard Verification Plan;
- Draft/Final Construction Quality Assurance Plan;
- Draft/Final Construction Design Plans and Specifications;
- Final QAPP;
- Draft/Final H & S Plan;
- Draft Operation and Maintenance Plan;

- Draft/Final Capital and Operation and Maintenance Cost Estimate. This cost estimate will refine the FS cost estimate to reflect the detail presented in the Final Design; and

- Draft/Final Project Schedule for the construction and implementation of the remedy which identifies timing for initiation and completion of all critical path tasks. The final project schedule submitted as part of the Final Design will include specific deadlines for completion of the project and major milestones.

7. Community Relations Support

A community relations program will be implemented by U.S. EPA in consultation with Illinois EPA. The Settling Work Defendants will cooperate with the U.S. EPA and Illinois EPA by participating in the preparation of all appropriate information disseminated to the public and in public meetings that may be held or sponsored by the U.S. EPA or Illinois EPA to explain activities at or concerning the Site.

Community relations support will be consistent with Superfund community relations policy as stated in the "Guidance for Implementing the Superfund Program" and "Community Relations in Superfund - A Handbook".

8. Additional Studies

The U.S. EPA, in consultation with Illinois EPA, may require the Settling Work Defendants to perform additional studies to supplement the available technical data or as otherwise needed. The Settling Work Defendants will furnish all equipment, personnel and funding necessary to complete any additional studies needed.

Task VII: Phase II Remedial Action Construction

A. The Settling Work Defendants will implement the RA as detailed in the approved Design.

B. The following activities will be completed in constructing the RA:

1. RA Work Plan

The Settling Work Defendants shall prepare and submit for approval, to U.S. EPA, a Remedial Action Work Plan (RA Work Plan) for implementation of the RA. Any questions concerning design requirements or specifications shall be noted in the draft of this document.

The document shall outline the overall management strategy for performing the construction, operation, maintenance and monitoring of the RA. The RA Work Plan shall include a project schedule for each major activity and submission of deliverables generated during the RA as well as a schedule for completion of the RA.

The RA Work Plan shall also include a description of qualifications of key personnel directing the RA, including contractor personnel. The Settling Work Defendants shall submit a RA Work Plan according to the schedule identified in Section V of the SOW. Upon approval of the RA Work Plan by U.S. EPA, Settling Work Defendants shall implement the activities set forth therein in accordance with the approved schedule.

2. Construction Quality Assurance Program Plan

The Settling Work Defendants will submit a draft Construction Quality Assurance Program (CQA) Plan, in accordance with Section V of the SOW. The Settling Work Defendants will finalize the Construction Quality Assurance Plan incorporating comments received on the draft Construction Quality Assurance Plan, in accordance with the schedule in Section V of the SOW.

The CQA Plan will assure that a completed remedy will meet or exceed all design criteria, plans and specifications. The CQA plan is a Site-specific document which must be approved by U.S. EPA prior to the start of the construction. At a minimum, the CQA plan should include the elements which are summarized below.

a. Responsibility and Authority

The Settling Work Defendants will describe fully in the CQA Plan the responsibility and authority of all organizations (i.e., technical consultants, construction firms, etc.) and key personnel involved in the construction of the corrective measure. The Settling Work Defendants will also identify a CQA officer and the necessary supporting inspection staff.

b. Construction Quality Assurance Personnel Qualifications

The Settling Work Defendants will set forth the qualifications of the CQA Officer and supporting inspection personnel in the CQA plan to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities.

c. Inspection Activities

The Settling Work Defendants will summarize in the CQA plan the observations and tests that will be used to monitor the construction and/or installation of the components of the remedial action. The plan will include the scope and frequency of each type of inspection. Inspections will verify and document compliance with environmental requirements and include, but not be limited to air quality and emissions monitoring records, waste disposal records (e.g., RCRA transportation manifests), etc. The inspection will also ensure compliance with all health and safety procedures. In addition to the oversight inspections, the Settling Work Defendants will conduct the following activities:

i. Preconstruction inspection and meeting

The Settling Work Defendants will conduct a preconstruction inspection and meeting to:

- Review methods for documenting and reporting inspection data;
- Review methods for distributing and storing documents and reports;
- Review work area security and safety protocol;
- Discuss any appropriate modifications of the construction quality assurance plan to ensure that Site-specific considerations are addressed; and
- Conduct a Site walk-around to verify that the design criteria, plans and specifications are clearly understood and to review material and equipment storage locations.

The preconstruction inspection and meeting will be documented by a designated person and minutes will be transmitted to representatives of the Parties to the Consent Decree in accordance with the schedule in Section V of the SOW.

ii. Pre-final inspection

Upon preliminary project construction completion, Settling Work Defendants will notify U.S. EPA for the purposes of conducting a pre-final inspection. The pre-final inspection will consist of a walk-through inspection of the entire project Site. The inspection will be conducted to determine whether the project is complete and consistent with the contract documents and the U.S. EPA- approved remedial action. Any outstanding construction items discovered during the pre-final inspection will be identified and noted. Additionally, all operating systems and equipment will be operationally tested by Settling Work Defendants.

The Settling Work Defendants will certify that the remedy will perform as designed and that all specifications have been met. Settling Work Defendants will correct deficiencies noted during the pre-final inspection and will initiate and complete retesting, as directed by U.S. EPA. The Settling Work Defendants will submit a Pre-final Inspection Report to U.S. EPA for approval within thirty (30) days of the pre-final inspection, outlining the outstanding construction items, actions required to resolve such items, the completion date for these items and the date for the final inspection.

iii. Final inspection

The final inspection will take place no later than thirty (30) days after the submission of the Pre-final Inspection Report. The final inspection will consist of a walk-through inspection of the project Site. The U.S. EPA-approved Pre-final Inspection Report will be used as a checklist for the final inspection. The final inspection will focus on the outstanding construction items identified in the pre-final inspection. At the time of the final inspection, Settling Work Defendants will certify that all outstanding items have been resolved.

d. Documentation

The Settling Work Defendants will describe in detail in the CQA plan the reporting requirements for CQA activities. This will include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports and final documentation. Provisions for the final storage of all records will be presented in the CQA plan.

3. Implementation of CQA Plan

As approved in the Final Project Schedule, Settling Work Defendants will construct and implement the remedy in accordance with the approved design, schedule and CQA plan.

Task VIII: Reports and Submissions

The Settling Work Defendants will prepare plans, specifications and reports as set forth in Task I through Task VII to document the design, construction, operation, maintenance and monitoring of the remedy. Documentation will include, but not be limited to the following:

1. Progress Reports

The Settling Work Defendants will, at a minimum, provide U.S. EPA and Illinois EPA with signed monthly progress reports during the design and construction phases and quarterly progress reports for operation and maintenance activities containing:

a. A description and estimate of the percentage of the RD/RA completed;

b. Summaries and discussion of all findings;

c. Summaries and discussion of all approved and unapproved changes made in the RD/RA during the reporting period;

d. Summaries of all contacts with representatives of the local community, public interest groups, or local or State governments during the reporting period;

e. Summaries of all problems or potential problems encountered during the reporting period;

f. Actions being taken to rectify problems;

g. Changes in personnel during the reporting period;

h. Projected work for the next reporting period; and

i. Copies of daily reports (i.e.,log book) if requested by U.S. EPA, inspection reports, laboratory/ monitoring data, and any other documents required by U.S. EPA.

2. Draft Reports and Submittals

a. The Settling Work Defendants will submit PDDC, RD and RA Work Plans outlined in Tasks I, II, IV, V, and VII as required by the schedule contained in Section V;

b. The Settling Work Defendants will submit draft Construction Plans and Specifications, Cost Estimates, Schedules, Operation and Maintenance Plans, and PDDC Investigations and Studies Report, as outlined in Tasks I, III and VI and as required by the schedule in Section V;

c. The Settling Work Defendants will submit a draft Construction Quality Assurance Program Plan and Documentation as outlined in Tasks IV and VII; and

d. Within thirty (30) days of the final inspection, the Settling Work Defendants will submit a draft Construction Completion Report to the U.S. EPA and the State. The report will document that the remedy , as constructed, is consistent with the design specifications, and that the remedy will perform adequately. The Report will include, but not be limited to the following elements:

i. Synopsis of the remedial action;

ii. Certification (by a registered professional engineer) of the design and construction;

iii. Explanation of any approved or unapproved modifications to the plans and why these were necessary for the project;

iv. Listing of the clean-up standards and performance standards established before the implementation was initiated for judging the functioning of the remedial action;

v. Results of all pilot tests, field tests, studies and Site monitoring, and certification that the remedy will meet or exceed the performance standards; and

vi. Explanation of the operation and maintenance (including monitoring) to be undertaken at the Site.

3. Final Reports and Submittals

The Settling Work Defendants will finalize the RD Work Plans, Construction Plans and Specifications, Cost Estimates, Project Schedule, Operation and Maintenance Plan, and PDDC Investigations and Studies Report, Construction Quality Assurance Program Plan/Documentation and the Construction Completion Report incorporating comments received on previous submissions. The Settling Work Defendants will implement all U.S. EPA approved submittals. The reports will be submitted in accordance with the schedule in Section V of the SOW.

V. SUBMISSION SCHEDULE

The submission or re-submission of any plans, reports or other items shall be covered under Section XII of the Consent Decree.

The Settling Work Defendants will comply with the schedule presented below:

Submission	Due Date
(Task I)	
Pre-Design Data Collection Work Plan	60 days after the issuance of an authorization to proceed or within 30 days of entry of the Consent Decree, whichever is later
PDDC Investigations and Studies Report	As required in the schedule set forth in the PDDC Work Plan approved by U.S. EPA
Phase I RD Work Plan	45 days after receipt of U.S. EPA approved PDDC Investigations and Studies Report and the U.S. EPA identified Phase I remedy.
Design Phase (Task III)	
Preliminary Design (30% completion)	75 days after receipt of U.S. EPA approval of the Phase I RD Work Plan
Intermediate Design (if necessary) (60% completion)	60 days after receipt of U.S. EPA comments on the Preliminary Design
Pre-final Design (95% completion)	75 days after receipt of U.S. EPA comments on the Intermediate Design
Final Design (100% completion)	30 days after receipt of U.S. EPA comments on the Pre-final Design
Phase I RA Work Plan	45 days after receipt of U.S. EPA approval of the Phase I RD

Phase II RD Work Plan	45 days after U.S. EPA's decision that the Phase II remedy is required
Design Phase (Task VI)	
Preliminary Design (30% completion)	75 days after receipt of U.S. EPA approval of the Phase II RD Work Plan
Intermediate Design (if necessary) (60% completion)	60 days after receipt of U.S. EPA comments on the Preliminary Design
Pre-final Design (95% completion)	75 days after receipt of U.S. EPA comments on the Intermediate Design
Final Design (100% completion)	30 days after receipt of U.S. EPA comments on the Pre-final Design
Phase II RA Work Plan	45 days after receipt of U.S. EPA approval of the Phase II RD

Submittals Concurrent with Pre-final Design

Performance Standard Verification Plan
Construction Quality Assurance Plan
Construction Designs and Specifications
QAPP
Health & Safety Plan
Draft Operation & Maintenance Plan
Capital and Operation and Maintenance Cost Estimate
Project Schedule

Submittals Concurrent with the Final Design

Performance Standard Verification Plan
Construction Quality Assurance Plan
QAPP
Health & Safety Plan
Capital and Operation and Maintenance Cost Estimate
Project Schedule

Preconstruction Meetings	As required in the schedule set forth in the RD(s)
Preconstruction Meeting Report	30 days after the meeting
Implementation of Remedial Action	As required in the Schedule set forth in the Design(s) as approved by U.S. EPA
Pre-final Inspection Report	30 days after Pre-final Inspection
Construction Completion Report	30 days after final inspection
Progress Reports for Tasks I through VII	Monthly
Progress Reports during Operation and Maintenance	Quarterly

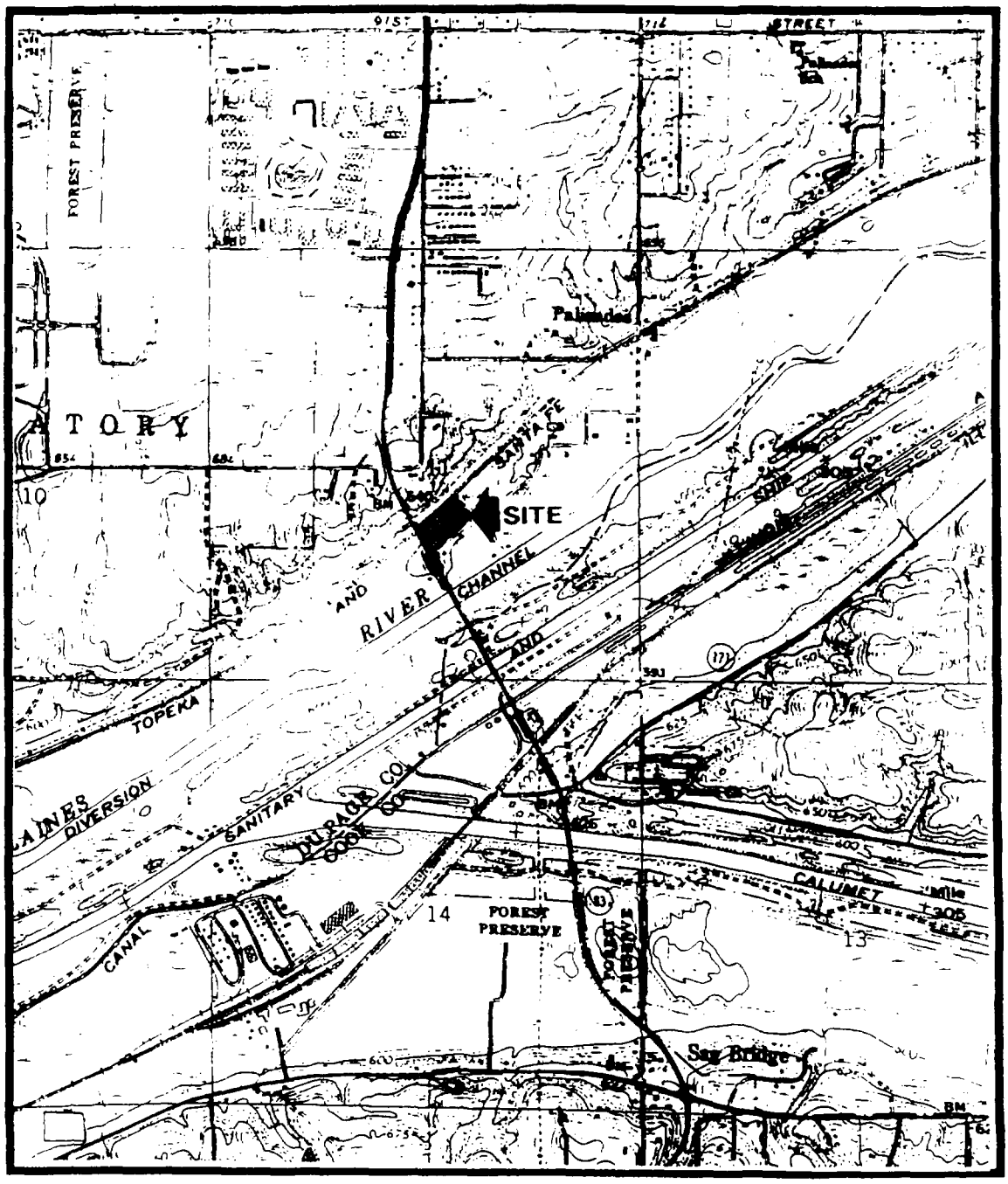
Site Description

The Lenz Oil site consists of the former Lenz Oil Services, Inc., facility and adjacent areas where wastes from the facility have come to be located. The Lenz Oil facility is situated northeast of the intersection of Illinois Route 83 and Jeans Road in southeastern DuPage County, Illinois, approximately 3.5 miles northeast of the center of Lemont, Illinois. The Lenz Oil facility is located in the southeast 1/4 of Section 11, T37N, R11E of the third principal meridian. Adjacent areas where facility wastes have migrated are known to include contaminants located in soils and sediments in and around a ditch northwest of the facility, and contaminants which have migrated south from the facility and across Jeans Road (See map - Location of LNAPL Plume).

SAG BRIDGE QUADRANGLE

ILLINOIS

7.5 MINUTE SERIES (TOPOGRAPHIC)
1963
PHOTOREVISED 1973
PHOTOREVISED 1978

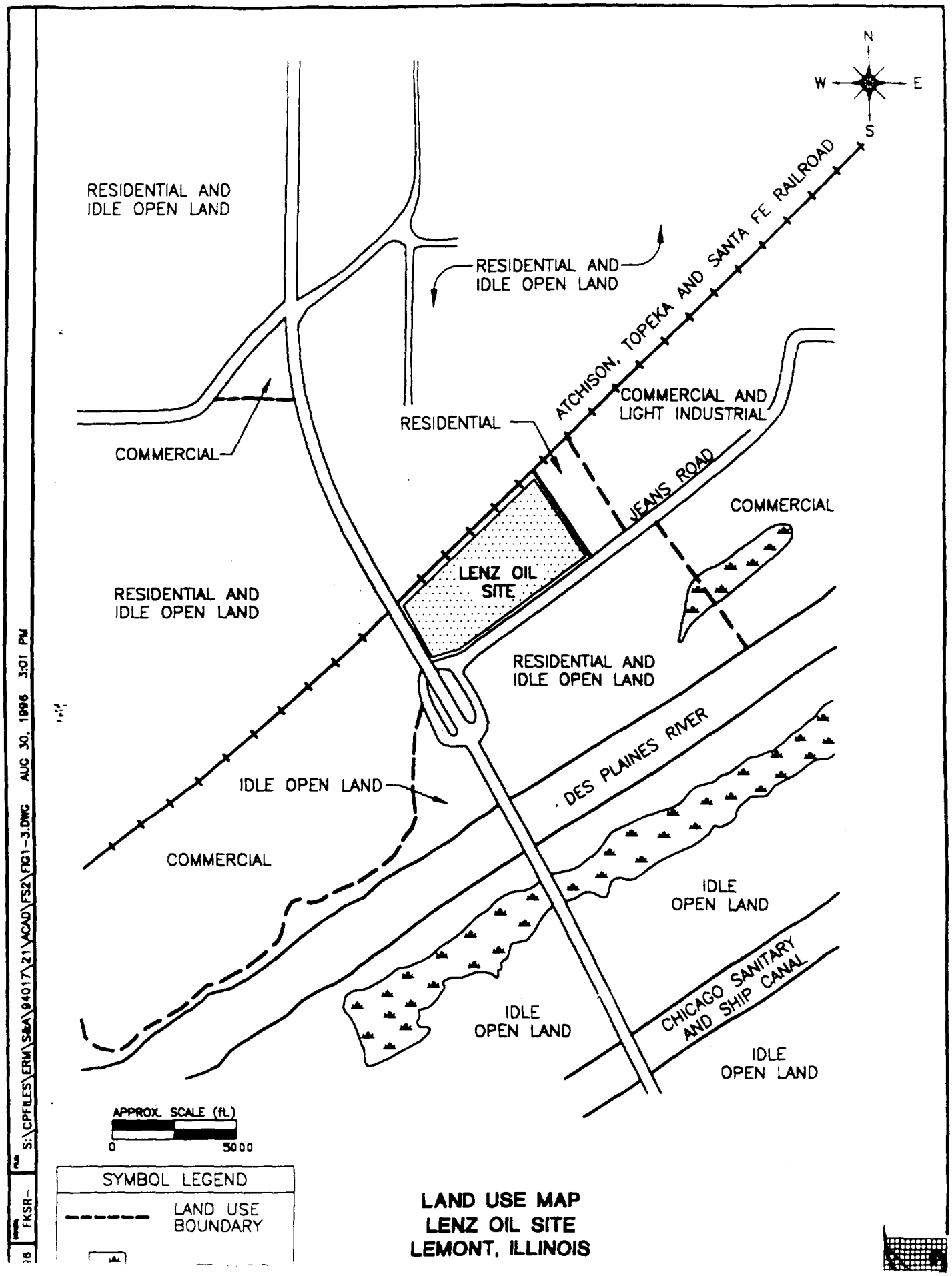


SCALE 1:24000

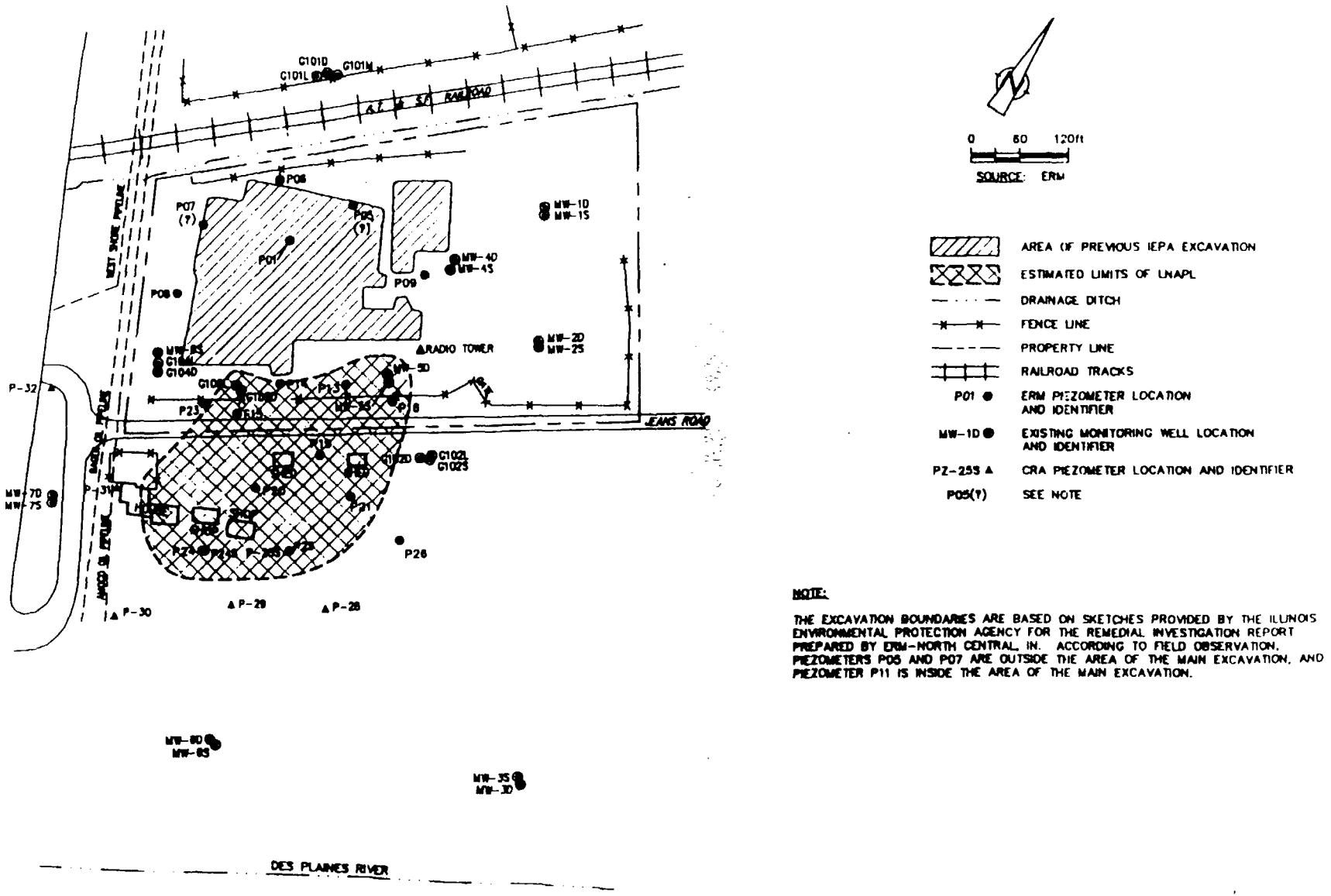
1 .5 0 1 MILE

CONTOUR INTERVAL 5 FEET

SITE LOCATION MAP
LENZ OIL SITE



LAND USE MAP
LENZ OIL SITE
LEMONT, ILLINOIS



Location of LNAPL Plume

Source: Figure 1.2, Feasibility Study Addendum, Conestoga-Rovers & Associates, October 1998

Appendix D – Settling Defendants

1. Air Liquide America Corporation, formerly known as LAI Properties, Inc., formerly known as LAI Holdings, Inc., formerly known as Liquid Air, Inc., successor in interest by merger to Cardox Corporation ("Cardox")

2. Alpha Construction Company ("Alpha Construction")

3. R. Ralph Artim, on behalf of Artim Transportation System, Inc., doing business as Artim Transportation Systems, Inc. ("Artim Transportation")

4. Kathryn A. Basil on behalf of Toyota West, Inc., formerly known as Toyota of St. Charles, Inc. ("Toyota West")

5. BFI Waste Systems of North America, Inc. in its own capacity, and as a successor in interest by corporate merger to E&E Hauling, Inc. ("BFI")

6 Bill Stillwell Buick, Inc. ("Bill Stillwell Buick")

7. Birkey's Farm Store, Inc. ("Birkey's Store")

8 Boncosky Transportation, Inc. on behalf of itself and Seyller Transport, Inc. ("Boncosky")

9. Borg Pontiac - GMC Truck, Inc., also known as Borg Pontiac, Inc., doing business as Borg Nissan, Inc. ("Borg Pontiac")

10. Bower Motors, Inc. ("Bower Motors")

11. Butler Aviation International, Inc. ("Butler Aviation")

12 Cheesman Chevrolet Oldsmobile Buick, Inc., formerly known as Cheesman Chevrolet Oldsmobile Buick Geo, Inc. ("Cheesman")

13. Commonwealth Edison Company ("ComEd")

14. Crown Cork & Seal Company, Inc. ("Crown Cork & Seal")

15 Dick James Ford Company ("Dick James Ford")

16. Dombrowski & Holmes, Inc. ("Dombrowski & Holmes")

17. Exolon-ESK Company ("Exolon-ESK")

18 Flexible Steel Lacing Company ("Flexible Steel")

19. Harcros Chemicals Inc ("Harcros Chemicals")

Appendix D – Settling Defendants

20. Henry Technologies, Inc., also doing business as Henry Valve Company ("Henry Technologies")

21. Hondo, Inc., doing business as Coca-Cola Bottling Co. of Chicago ("Coca-Cola Bottling Co ")

22. Howard Pontiac Inc. ("Howard Pontiac")

23 International Truck and Engine Corporation, a successor in interest to Navistar International Transportation Corp. and International Harvester Company ("International Harvester (Navistar)")

24. Jacobs' Twin Buick, Inc. ("Jacobs' Twin Buick")

25. Jefferson Smurfit Corporation (U.S.), formerly known as Container Corporation of America ("Container Corporation of America")

26. Joe Madden Motors, Inc., formerly known as Joe Madden Ford, Inc. ("Joe Madden Ford")

27. Kayser Ford, Inc. in its own capacity and as successor in interest to a dissolved corporation known as the K Group, Inc., formerly known as Kayser Ford, Inc. ("Kayser Ford")

28. John and Tom Kranz, doing business as Kranz Service, Inc., and Kranz Service, Inc. (collectively "Kranz Service")

29. Lakar Enterprises, Inc., also known as Lakar Industries, Inc., doing business as Romines' Standard Plaza and Truck ("Romines' Standard")

30. Laurel Motors, Inc. ("Laurel Motors")

31. Lewis University ("Lewis University")

32 Madison Gas and Electric Company ("Madison Gas")

33. McAllister Equipment Company ("McAllister Equipment")

34. McGill Manufacturing Company, Inc. ("McGill Mfg.")

35. Northern Indiana Public Service Company ("Northern Indiana Public Service")

36. O-E Illinois, Inc. ("O-E Illinois")

37. Owens-Illinois, Inc. ("Owens-Illinois")

38. Packey Webb Ford, an Illinois Limited Partnership ("Packey Webb Ford")

Appendix D – Settling Defendants

39. Patrick Schaumburg Automobile, Inc. also known as Patrick Schaumburg Automobiles, Inc., doing business as Patrick Cadillac; Patrick Libertyville Automobile, Inc., formerly known as Libertyville Motors, Inc., doing business as Patrick Pontiac/GMC Truck; Patrick European LLC, formerly Hanley Dawson BMW, Inc., doing business as Patrick BMW; Patrick LLC, doing business as Patrick Saab; Patrick Motors, Inc.; Patrick Imports, Inc.; and Patrick Suzuki, Inc. (collectively "Patrick")

40. Patten Industries, Inc. ("Patten Industries")

41. Penske Truck Leasing Co., L.P., also known as Penske Truck Leasing Co., Inc., and Penske Truck Leasing Corp. ("Penske Truck")

42. Quebecor World KRI Inc., f/k/a KRI, Inc., f/k/a Krueger Ringier, Inc., f/k/a W. F. Hall Printing Company on behalf of itself and those entities described by the United States and the State of Illinois as W. F. Hall Printing Company and Chicago Rotoprint Company; and Quebecor World RAI Inc., f/k/a RAI, Inc., f/k/a Ringier America, Inc., f/k/a W. A. Krueger Co., on behalf of itself and those entities described by the United States and the State of Illinois as Krueger Pontiac and Ringier America - Pontiac Division (collectively "Quebecor World USA KRI/RAI Entities")

43. Rexam Beverage Can Company, formerly known as American National Can Company ("American Can")

44. Raymond J. Schwindaman, doing business as Schwindaman Motors, Inc. and Schwindaman Motors, Inc. (collectively "Schwindaman Motors")

45. Sears, Roebuck and Co. ("Sears, Roebuck & Co.")

46. Union Special Corporation ("Union Special")

47. Zellmer Truck Lines, Inc. ("Zellmer Truck Lines")

Appendix D.1 – Settling Work Defendants

1. Quebecor World USA KRI/RAI Entities
2. Owens-Illinois
3. BFI
4. ComEd
5. Harcros Chemicals
6. Coca-Cola Bottling Co.
7. Jacobs' Twin Buick
8. Kayser Ford
9. Bower Motors
10. Laurel Motors
11. Crown Cork & Seal
12. Dombrowski & Holmes
13. Bill Stillwell Buick
14. International Harvester (Navistar)
15. Schwindaman Motors
16. Madison Gas
17. Artim Transportation
18. Zellmer Truck Lines
19. Alpha Construction
20. Kranz Service
21. Howard Pontiac
22. O-E Illinois
23. Packey Webb Ford

Appendix D.1 – Settling Work Defendants

24. Sears, Roebuck & Co.

25. Flexible Steel

APPENDIX D.2 - SETTLING CASH DEFENDANTS	
Party	**Settlement Amount**
American Can	$262,296.70
Penske Truck	$177,100.56
Container Corporation of America	$161,516.39
Cheeseman	$129,799.70
Exolon-ESK	$160,657.46
Boncosky	$135,375.39
Birkey's Store	$136,710.22
Henry Technologies	$126,045.37
Northern Indiana Public Service	$124,125.44
McGill Mfg.	$425,850.34
Joe Madden Ford	$341,291.97
Borg Pontiac	$185,049.85
Union Special	$159,331.05
Lewis University	$159,269.60
Toyota West	$150,540.80
Patrick	$136,305.94
Dick James Ford	$134,724.88
Patten Industries	$126,136.40
McAllister Equipment	$122,845.01
Cardox	$121,908.25
Butler	$120,894.04
Romines' Standard	$113,983.46

Appendix D.3 – Past State Settling Defendants

1. Quebecor World USA KRI/RAI Entities
2. Owens-Illinois
3. BFI
4. ComEd
5. McGill Mfg.
6. Harcros Chemicals
7. Coca-Cola Bottling Co.
8. Jacobs' Twin Buick
9. Joe Madden Ford
10. American Can
11. Bower Motors
12. Laurel Motors
13. Borg Pontiac
14. Penske Truck
15. Packey Webb Ford
16. Union Special
17. Container Corporation of America
18. Sears, Roebuck & Co.
19. Exolon-ESK
20. Lewis University
21. Flexible Steel
22. Toyota West

Appendix D.3 – Past State Settling Defendants

23. Patrick

24. Boncosky

25. Henry Technologies

26. Patten Industries

27. McAllister Equipment

28. Cardox

29. Butler Aviation

30. Romines Standard

31. Dick James Ford

APPENDIX D.4 - SETTLING STATE DEFENDANTS	
Party	**Settlement Amount**
Kayser Ford	$119,643 29
Dombrowski & Holmes	$128,535 00
International Harvester (Navistar)	$ 66,990 00
Schwindaman Motors	$ 67,228 70
Madison Gas	$ 66,990 00
Artim Transportation	$ 65,989 00
Zelmer Truck Lines	$ 64,291 30
Alpha Construction	$ 62,830 30
Kranz Service	$ 62,725 50
Howard Pontiac	$ 60,845 40
O-E Illinois	$ 58,658 60
Northern Indiana Public Service	$ 85,981 76
Crown Cork and Seal	$100,292 50
Birkey's Store	$ 62,430 29
Bill Stillwell Buick	$118,737 61
Cheeseman	$59,274 52

Appendix D.5 – RI/FS Past Participating Defendants

1. Quebecor World KRI/RAI Entities
2. Owens-Illinois
3. E & E
4. ComEd
5. McGill Mfg.
6. Coca-Cola Bottling Co.
7. Jacobs' Twin Buick
8. Joe Madden Ford
9. American Can
10. Bower Motors
11. Laurel Motors
12. Borg Pontiac
13. Penske Truck
14. Packey Webb Ford
15. Union Special
16. Container Corporation of America
17. Exolon-ESK
18. Lewis University
19. Flexible Steel
20. Patrick
21. Boncosky

22. Dick James Ford

23. Henry Technologies

24. Patten Industries

25. McAllister Equipment

26. Cardox

27. Butler Aviation

28. Romines Standard

29. Northern Indiana Public Service

APPENDIX D.6 - RI/FS SETTLING DEFENDANTS	
Party	**Settlement Amount**
BFI-NA	$57,903.35
Kayser Ford	$20,556.34
Crown Cork and Seal	$17,231.58
Dombrowski & Holmes	$14,919.73
Sears, Roebuck & Co.	$14,097.48
Bill Stillwell Buick	$13,775.73
Toyota West	$13,036.89
International Harvester (Navistar)	$11,511.55
Schwindaman Motors	$11,547.30
Madison Gas	$11,511.55
Artim Transporation	$11,332.80
Zellmer Truck Lines	$11,046.80
Alpha Construction	$10,796.55
Kranz Service	$10,725.05
Birkey's Store	$10,725.05
Howard Pontiac	$10,450.96
O-E Illinois	$10,081.55
Cheeseman	$10,129.21

Appendix E

LENZ OIL ESCROW AGREEMENT

This agreement ("Escrow Agreement" or "Agreement") is entered into between members of the Lenz Oil RD/RA Work Group ("Group") whose names are listed in Attachment A ("Members") and the LaSalle Bank National Association ("Escrow Agent").

BACKGROUND TO AGREEMENT

Whereas the Members have organized themselves into the Group for the purpose of satisfying their obligations under a consent decree negotiated with the United States Environmental Protection Agency ("USEPA") and the State of Illinois to be lodged with and entered by United States District Court for the Northern District of Illinois ("Consent Decree"), regarding performance of the remedial design and remedial action ("RD/RA) at the Superfund site at Route 2, Lemont, Dupage County, Illinois, commonly known as the Lenz Oil Superfund Site ("Site").

Whereas the Consent Decree requires that the Lenz Oil Site Escrow Account be established and that the Lenz Oil Escrow Agreement be attached and incorporated into the Consent Decree.

Whereas the Members, pursuant to the authority under paragraph 33 of the Lenz Oil PRP Group Agreement dated March 2, 2001 ("PRP Agreement"), have agreed to establish an account for the deposit and investment of funds collected pursuant to the PRP Agreement and the Consent Decree;

Whereas the Members, pursuant to paragraph 20 of the PRP Agreement, have authorized Alan Bielawski to execute this Agreement on behalf of the Members,

as, and solely as, their authorized agent.

Whereas the Members wish to retain the Escrow Agent, and the Escrow Agent wishes to be retained by the Members, as Escrow Agent for the Lenz Oil Site Account, in accordance with the terms hereinafter set forth.

1. Establishment of Escrow Account. An escrow account ("Lenz Oil Site Account" or "Escrow Account") is hereby established to provide for the holding, investing, reinvesting and dispensing of payments to satisfy the Members' financial obligations as specified in the PRP Agreement and in the Consent Decree. (The Lenz Oil Site Account is defined as the "Lenz Oil Site Escrow Account" in the Consent Decree.) The Escrow Agent shall hold all funds deposited pursuant to this Agreement in the Escrow Account for the benefit of the Members, subject to disbursement as provided in this Agreement. The funds deposited in the Escrow Account and income earned on such funds shall be available to assist the Group in meeting the financial assurance requirements of Section XIII of the Consent Decree. The Escrow Account shall be maintained at and by the Escrow Agent, not individually, but solely as Escrow Agent. The Escrow Account shall include all sub-accounts ("Sub-Accounts") as described in Exhibit B.

2. Investment of the Escrow Account.

a. The Escrow Agent shall invest and reinvest the principal and income of the Escrow Account into the ABN-AMRO Tax Exempt Money Market Fund until advised to the contrary, in writing, by two of the three authorized representatives of the Members (hereinafter any two such authorized representatives shall be referred to as the "Authorized Representatives"). The names and signatures of the three authorized representatives shall be provided to the Escrow Agent by the Chairman of the Group at the time this Agreement is executed on behalf of the Members. In the event that the Escrow Agent is directed to invest the Escrow Account in a source different from that

which is set forth above, such investment shall be limited to securities issued or guaranteed by the Federal Government, time or demand deposits issued or guaranteed by the Federal government, obligations producing income which is exempt from Federal and/or state taxation, or money market mutual funds limited to investing exclusively in such securities, deposits, or obligations.

b. The principal in the State Segregated Sub-Account (resulting from payments made pursuant to paragraph 65.b. of the Consent Decree) shall be used only for the purposes of paying for the costs of implementing the RD/RA.

3. Escrow Agent's Obligations. The obligations and duties of the Escrow Agent are confined to those specifically enumerated herein. The Escrow Agent shall not be subject to, nor be under any obligation to ascertain or construe the terms and conditions of any other instrument, whether or not now or hereafter deposited with or delivered to the Escrow Agent or referred to herein, nor shall the Escrow Agent be obliged to inquire as to the form, execution, sufficiency, or validity of any such instrument. The Escrow Agent shall not be obliged to inquire as to the identity, authority, or rights of the person or persons executing or delivering the same provided that the Escrow Agent compares the identity and signatures on the instrument with the identity and signatures of the Authorized Representatives which will be provided to the Escrow Agent before any deposits are made pursuant to this Agreement, and those signatures reasonably appear to be similar. The Escrow Agent shall not be subject to, nor obliged to recognize, monitor or enforce the terms of any other agreement between, or direction or instruction of, any or all of the Members.

The Escrow Agent shall not be responsible for the sufficiency or accuracy of any endorsement or lack of endorsement on any check deposited into the Escrow Account, nor shall the Escrow Agent be responsible or liable in any respect on account of the identity, authority or rights of the persons executing or delivering or

purporting to execute or deliver any such check or endorsement under this Agreement.

If the Escrow Agent should receive or become aware of any conflicting demands or claims with respect to the Escrow Account, or the rights of any of the parties hereto, or any money, property, or instruments deposited herein or affected hereby, the Escrow Agent shall have the right in its sole discretion, without liability for interest or damages, to discontinue any or all further acts on its part until such conflict is resolved to its satisfaction and/or to commence or defend any action or proceeding for the determination of such conflict. If the Escrow Agent becomes aware of such conflicting demands or claims, the Escrow Agent shall so notify the Authorized Representatives immediately.

4. Disbursements by Escrow Agent. The Authorized Representatives are hereby empowered to authorize and direct any and all disbursements by the Escrow Agent, as set forth in this Agreement. The Certification of Authorization applicable to these persons and specimens of their signatures will be provided to the Escrow Agent prior to any funds being deposited with Escrow Agent pursuant to this Agreement. Should the designation of the Authorized Representatives change, the Members shall promptly provide notice of such change to the Escrow Agent.

From time to time, the Authorized Representatives will deliver to the Escrow Agent written instructions that the Escrow Agent pay sums certain to specified individuals or entities from, or transfer monies between Sub-Accounts. The Escrow Agent agrees to promptly issue checks and make such transfers in accordance with such directions.

5. Tax Matters. The parties intend that the Escrow Account (including the Sub-Accounts) shall be classified for income tax purposes as a "qualified settlement fund" within the meaning of the U.S. Treasury Regulation 1.468B-1, and the Escrow Agent, as administrator of the Escrow Account under Treasury Regulation

1.468B-1, shall administer the Escrow Account in a manner consistent with such classification. In accordance with U.S. Treasury Regulations, the Authorized Representatives will provide to the Escrow Agent combined transferor statements. Notwithstanding any other provision of this Escrow Agreement, the Escrow Agent shall (i) obtain an employer identification number for the Escrow Account, (ii) reserve for and pay all taxes due with respect to the Escrow Account, including estimated taxes, in a timely manner, (iii) prepare and file all tax returns, on behalf of the Escrow Account as required by law, and (iv) withhold amounts from disbursements from the Escrow Account as required by applicable Federal, state or local tax law.

6. Collection and Deposits by Escrow Agent. The Escrow Agent shall as soon as practicable collect any checks or other collection items deposited pursuant to this Agreement. All such collections shall be subject to the usual collection agreement regarding items received by the Escrow Agent's commercial banking department for deposit or collection. The Escrow Agent shall not be required to take any legal action to enforce payment of any check deposited under this Agreement, but the Escrow Agent will notify the Authorized Representatives if any check deposited is dishonored.

7. Compensation of Escrow Agent. The Escrow Agent shall be compensated for services provided under this Agreement in accordance with the Fee Schedule attached hereto as Exhibit C.

8. Monthly Statements. Within 15 days following the end of each calendar month, commencing with the calendar month following the month during which funds are first deposited pursuant to this Agreement, the Escrow Agent shall issue to the Members a monthly statement which includes the following information regarding the transactions during the previous month for each Sub-Account: (i) all deposits received, by date, payor (if such deposit is made by check) and amount; (ii) all

checks issued, by date, payee, amount, payee invoice number and invoice date; (iii) all other distributions from the Escrow Account, including taxes paid and the Escrow Agent's fees and expenses, by date, description and amount; (iv) transfers between Sub-Accounts; (v) investment income; and (vi) the beginning and ending balances for each Sub-Account.

9. Valuation. The Escrow Agent shall furnish to the Members a statement confirming the value of the Escrow Account, including actual cash earnings year-to-date. Any securities in the Escrow Account shall be valued at market value.

10. Successor Escrow Agent. The Escrow Agent may resign only after giving 30 days written notice to the Members, but such resignation shall not be effective until a successor escrow agent has been appointed by the Members and this successor escrow agent accepts the appointment. The successor escrow agent shall have the same powers and duties as those conferred upon the Escrow Agent hereunder. Upon the successor escrow agent's acceptance of the appointment, the Escrow Agent shall promptly assign, transfer, and pay over to the successor escrow agent the funds and properties then constituting the Escrow Account less any and all outstanding fees and expenses then due to the Escrow Agent. If for any reason the Members cannot or do not act in the event of the resignation of the Escrow Agent, the Escrow Agent may apply to a court of competent jurisdiction for the appointment of a successor escrow agent or for instructions. The successor escrow agent shall specify the date on which it assumes administration of the escrow account in writing sent to the Members and the present Escrow Agent by certified mail 10 days before such change becomes effective.

11. Disbursements upon Termination. Upon termination of this Agreement, the Escrow Agent shall distribute any funds remaining in the Escrow Account to the Members in such amounts as designated by written instructions signed

by the Authorized Representatives.

12. Termination. Upon the disbursement of funds from the Lenz Oil Site Disbursement Special Account to the Escrow Account triggered by the issuance of the Certificate of Completion of the Remedial Action by USEPA, this Agreement may be terminated by the Members (voting in accordance with the terms of the PRP Agreement) by written notice of intent to terminate mailed to the Escrow Agent and to all Members. The Escrow Agent shall disburse the funds in the Escrow Account to the Members in such amounts as designated by a written instruction signed by the Authorized Representatives.

13. Method of Providing Notice. Any notices which the Escrow Agent is required or desires to give under this Agreement to the Members may be given by mailing the same to each Member at the address indicated in Attachment A (or to such other address as the Authorized Representatives may substitute by written notification), by United States mail, postage prepaid. Any notice so mailed shall be effective on the third business day following the date of deposit with the United States Postal Service to such Member.

Notices to the Escrow Agent shall not be deemed to be given until actually received by the employee or officer responsible for administering this Agreement. Whenever the time for giving a notice or performing an act falls upon a Saturday, Sunday or holiday, such time shall be extended to the next business day.

14. Notices. The Escrow Agent shall disregard any and all notices or instructions given by any Member or by any other person, firm or corporation, except (i) notices or instructions received pursuant to the terms of this Agreement, and (ii) orders or process of any court entered or issued with or without jurisdiction. Escrow Agent shall promptly notify the Members of Escrow Agent's receipt of any notices or

instructions that were not received pursuant to the terms of this Agreement.

15. Court Orders. The Escrow Agent shall promptly notify the Authorized Representatives of receipt of any court order, judgment or decree relating to this Agreement or the Escrow Account. If any court order, judgment or decree at any time (i) attaches, garnishes, or levies upon any property subject to this Agreement; (ii) stays or enjoins payment, assignment, transfer, conveyance or delivery of any such property; or (iii) otherwise affects any part of such property, then the Escrow Agent is not required to obtain prior approval from the Members before complying with any such order, writ, judgment or decree, provided the Escrow Agent has been advised by legal counsel of its own choosing that any such order, writ, judgment or decree is binding upon the Escrow Agent. If the Escrow Agent complies with any such order, writ, judgment or decree, it shall not be liable to any of the Members or to any other person, firm or corporation by reason of such compliance even though such order, writ, judgment or decree may be subsequently reversed, modified, annulled, set aside or vacated.

16. Limitation of Liability. The Escrow Agent shall not be liable for any act which it may do or omit to do hereunder in good faith and in the exercise of its own best judgment. Any act done or omitted by the Escrow Agent pursuant to the advice of its attorneys shall be presumed to have been performed or omitted in good faith by the Escrow Agent.

The Escrow Agent shall advise in advance the Members in writing of those matters for which the Escrow Agent intends to seek advice from its attorneys.

The Escrow Agent's duties and responsibilities in connection with this Agreement shall be purely ministerial and shall be limited to those expressly set forth in this Agreement. The Escrow Agent is not a principal, participant or beneficiary in any transaction underlying this Agreement and shall have no duty to inquire beyond the

terms and provisions hereof. The Escrow Agent shall have no responsibility or obligation of any kind in connection with this Agreement and shall not be required to deliver the property held in the Escrow Account or any part thereof or take any action with respect to any matters that might arise in connection therewith, other than to hold and deliver the property as herein provided. Without limiting the generality of the foregoing, it is hereby expressly agreed and stipulated by the parties hereto that the Escrow Agent shall not be required to exercise any discretion hereunder and shall have no investment or management responsibility and, accordingly, shall have no duty to, or liability for its failure to, provide investment recommendations or investment advice to the other parties to this Agreement. The Escrow Agent shall not be liable for any error in judgment, any act or omission, any mistake of law or fact, or for anything it may do or refrain from doing in connection herewith, except for its own willful misconduct or gross negligence. It is the intention of the parties hereto that the Escrow Agent shall never be required to use, advance or risk its own funds or otherwise incur financial liability in the performance of any of its duties or the exercise of any of its rights and powers hereunder.

Before the Escrow Agent acts or refrains from acting, it may request, and shall be entitled to receive, written direction from the Authorized Representatives. The Escrow Agent shall not be liable for any action it takes or omits to take in good faith in reliance on such written direction.

17. Indemnification. The Members agree, jointly and severally, to indemnify and hold the Escrow Agent harmless from and against all costs (other than what the Escrow Agent has already received compensation for), damages, judgments, attorney's fees (whether such attorneys shall be regularly retained or specially employed), expenses, obligations and liabilities of every kind and nature which the Escrow Agent may incur, sustain, or be required to pay in connection with or arising

out of this Agreement, and to pay to the Escrow Agent on demand the amount of all such costs, damages, judgments, attorney's fees, expenses, obligations, and liabilities. The Escrow Agent shall notify the Members promptly of any claim for which it may seek indemnity. The Members shall not be obligated to pay any settlement made by the Escrow Agent without the written consent of the Authorized Representatives (pursuant to the authorization of the Membership). To secure said indemnification and to satisfy its compensation hereunder, the Escrow Agent is hereby given a first lien upon and the right to reimburse itself therefor out of, all of the rights, titles, and interests of each of said parties in all money, property, and instruments deposited hereunder. The foregoing indemnities in this paragraph shall survive the resignation or substitution of the Escrow Agent or the termination of this Agreement.

Notwithstanding the provisions stated above, the Escrow Agent shall not be indemnified or held harmless from or against any loss or liability resulting from the gross negligence, willful misconduct, or substantial breach of this Agreement by the Escrow Agent.

18. No Admission of Wrongdoing. Nothing in this Agreement shall constitute or be construed as an admission or acknowledgement by any Member of any fact, any conclusion of law, any liability, any violation of any statutory or other legal duty, or any wrongdoing whatsoever relating to or arising from any past, current or future activities at the Site, or be construed as creating any obligation by any Member with respect to the Site.

19. Confidentiality. The Escrow Agent agrees to maintain as confidential all documents and information provided by the Members or related to the terms of this Agreement. The Escrow Agent shall not disclose such information to any third party except as required by law, providing, however, that this confidentiality may

be waived in writing by the Authorized Representatives.

20. Choice of Law. This Agreement shall be construed, enforced and administered in accordance with the law of the State of Illinois.

21. Successors and Assigns. This Agreement shall be binding upon the successors and assigns of the Members and Escrow Agent.

22. Severability. If any provision of this Agreement is deemed invalid or unenforceable, the balance of this Agreement shall remain in full force and effect.

23. Interpretation. Section headings herein are inserted for convenience of reference only and are not intended to be part of or affect the meaning or interpretation of this Agreement.

24. Effective Date and Method of Execution. This Agreement shall become effective upon signature by any officer of the Escrow Agent and Alan Bielawski, as authorized agent of the Members.

25. Counterparts. This Agreement may be executed in two or more counterparts; each of which shall be deemed to be an original but all of which together shall constitute one and the same instrument.

26. Entire Agreement; Modification. This Agreement, together with all exhibits hereto, constitutes the entire Agreement among the parties pertaining to the matters contained herein. This Agreement may be modified only by a written instrument signed by the authorized representatives of the Group and the Escrow Agent.

The Escrow Agent and the Lenz Oil RD/RA Potentially Responsible Party Group Members have caused this Lenz Oil Escrow Agreement to be executed by

their duly authorized representatives as follows:

Lenz Oil Group Members

By:_____

Date:_____

LaSalle Bank National Association

By:_____

Date:_____

EXHIBIT A

LENZ OIL RD/DA WORK GROUP

1. Quebecor World KRI Inc., f/k/a KRI, Inc., f/k/a Krueger Ringier, Inc., f/k/a W. F. Hall Printing Company on behalf of itself and those entities described by the United States and the State of Illinois as W. F. Hall Printing Company and Chicago Rotoprint Company; and Quebecor World RAI Inc., f/k/a RAI, Inc., f/k/a Ringier America, Inc., f/k/a W. A. Krueger Co., on behalf of itself and those entities described by the United States and the State of Illinois as Krueger Pontiac and Ringier America - Pontiac Division
2. Owens-Illinois, Inc.
3. BFI Waste Systems of North America, Inc. in its own capacity, and as a successor in interest by corporate merger to E&E Hauling, Inc.
4. Commonwealth Edison Company
5. Harcros Chemicals Inc
6. Hondo, Inc., doing business as Coca-Cola Bottling Co. of Chicago
7. Jacobs' Twin Buick, Inc.
8. Kayser Ford, Inc. in its own capacity and as successor in interest to a dissolved corporation known as the K Group, Inc., formerly known as Kayser Ford, Inc.
9. Bower Motors, Inc.
10. Laurel Motors, Inc.
11. Crown Cork & Seal Company, Inc.
12. Dombrowski & Holmes, Inc.
13. Bill Stillwell Buick, Inc.
14. International Truck and Engine Corporation, a successor in interest to Navistar International Transportation Corp. and International Harvester Company
15. Raymond J. Schwindaman, doing business as Schwindaman Motors, Inc. and Schwindaman Motors, Inc.
16. Madison Gas and Electric Company
17. R. Ralph Artim, on behalf of Artim Transportation System, Inc., doing business as Artim Transportation Systems, Inc
18. Zellmer Truck Lines, Inc.

19. Alpha Construction Company

20. John and Tom Kranz, doing business as Kranz Service, Inc., and Kranz Service, Inc.

21. Howard Pontiac Inc.

22. O-E Illinois, Inc.

23. Packey Webb Ford, an Illinois Limited Partnership

24. Sears, Roebuck and Co.

25. Flexible Steel Lacing Company

EXHIBIT B

SUB-ACCOUNTS

At the direction of the Authorized Representatives described in the Escrow Agreement (or their designees), Escrow Agent shall establish and maintain a specified number of Sub-Accounts. Escrow Agent is to transfer funds from one Sub-Account to another at the direction of Authorized Representatives or their designees. Escrow Agent shall maintain records showing, at a minimum, deposits and transfers to, and disbursements from, such Sub-Accounts and provide statements to Authorized Representatives on a monthly basis. Initially, the following five sub-accounts are to be established for the purpose of depositing and holding funds paid pursuant to the Consent Decree or to fulfill the financial obligations of the Consent Decree: 1) Settling State Defendants Sub-Account (funds paid pursuant to paragraph 53.b. of the Consent Decree); 2) RI/FS Settling Defendants Sub-Account (funds paid pursuant to paragraph 53.c. of the Consent Decree); 3) Settling Cash Defendants Sub-Account (funds paid pursuant to paragraph 53.a. of the Consent Decree); 4) State Segregated Sub-Account (funds paid pursuant to paragraph 65.a. and b. of the Consent Decree; and 5) Working Sub-Account (assessments paid by the Members; interest from other Sub-Accounts; and reimbursements from the Lenz Oil Site Disbursement Special Account). Escrow Agent shall establish additional sub-accounts or close existing ones at the written direction of the Authorized Representatives.

EXHIBIT C

FEE SCHEDULE

Acceptance Fee: **$500.00**

Payment includes the initial and subsequent reviews of all documentation, execution of agreement, and the setting up of all accounts and sub-accounts.

Annual Administration Fee: **$3,000.00**

Payment includes receipt of funds, investment of proceeds, processing of disbursements, providing asset and transaction statements on a monthly basis, and all other responsibilities of the Escrow Agent as set forth in the Agreement.

Cancelled Check Fee: **$30/cancelled check**

Payment includes all costs incurred by Escrow Agent in providing Members copies of cancelled checks (front and back) issued by Escrow Agent in response to Members' request for copies of cancelled checks.

Annual Tax Preparation Fee: **$1,500.00**

Payment includes all fees charged in connection with the performance of Escrow Agent's obligations under Paragraph 5. of the Escrow Agreement.

Additional Charges:

All out-of-pocket expenses will be billed at Escrow Agent's costs. Out-of pocket expenses include, but are not limited to, travel expenses, telephone and facsimile transmission costs, postage (including express mail and overnight delivery charges), copying charges and professional services (e.g. legal or accounting), provided that Escrow Agent has provided Members prior notice of Escrow Agent's intention to seek said professional services.

The aforementioned Fee Schedule is guaranteed for three years from the date of

execution of the Agreement, but is subject to revision thereafter.